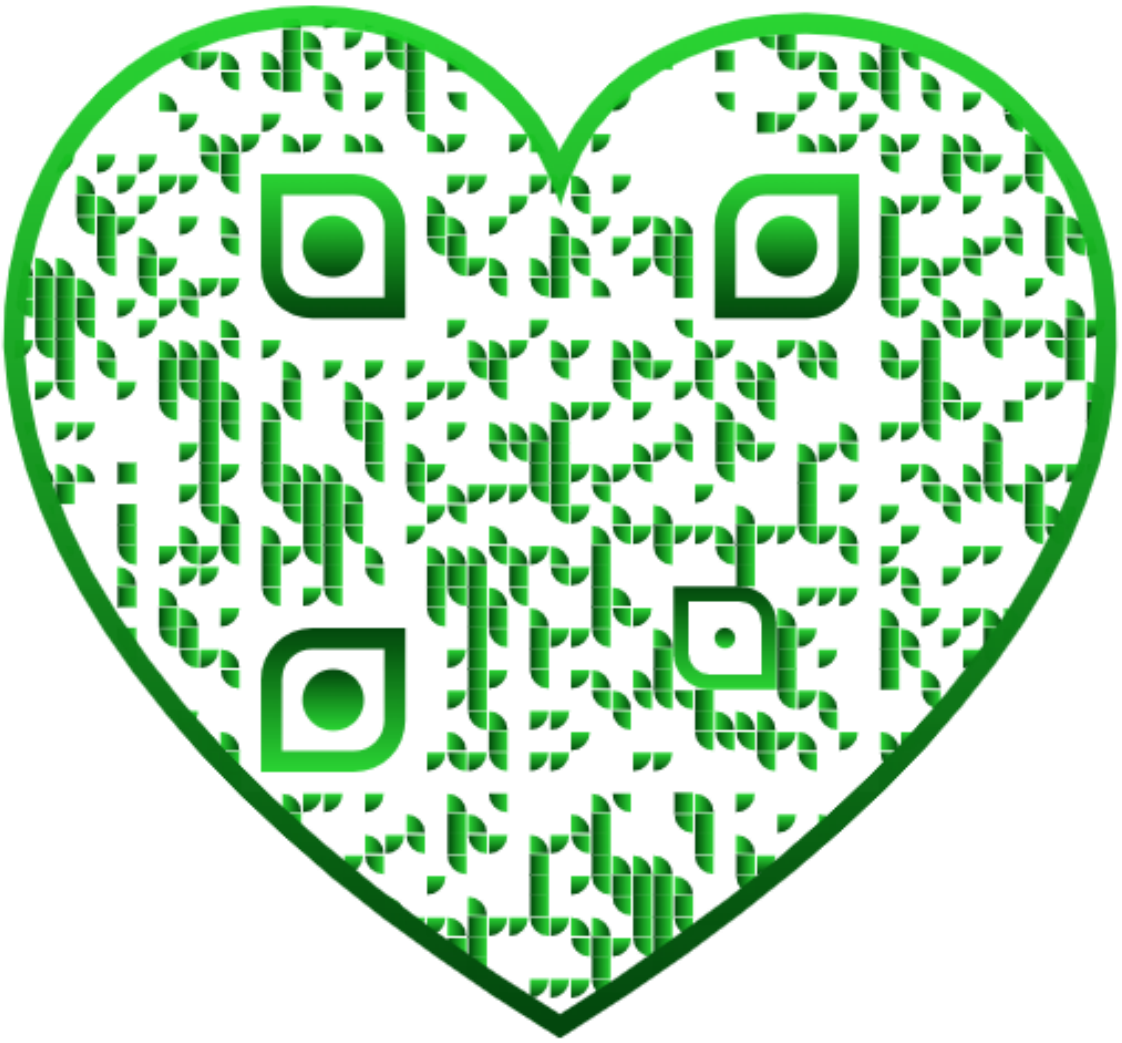
Dr. Konstantin Korotkov

ENERGY FIELDS
ELECTROPHOTONIC ANALYSIS
IN HUMANS AND NATURE

Be governed by your knowledge, and proceed
I' the sway of your own will

William Shakespeare
King Lear IV, 7



ENERGY FIELDS ELECTROPHOTONIC ANALYSIS IN HUMANS AND NATURE

Dr. Konstantin Korotkov

This book presents the state of the art, principles and ideas of Electrophotonic analysis based on Gas Discharge Visualization (GDV) technique, known as well as Electrophotonic Imaging (EPI). This approach, celebrating now 20 years after developing the first GDV instrument, has a strong scientific foundation with thousands of researchers, doctors and practitioners using it in the world. Electrophotonic methods allow to study Energy Fields of humans, water, materials and environment. Conceptual background and practical approaches are presented in this book.

Second updated edition

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In this book we use the following abbreviations:

1L, 2L.....5L and 1R.....5R	fingers of the left and right hands, correspondingly, beginning from thumb to little finger
2L/3	3rd sector of 2L finger
ADP	ADP is the product of ATP dephosphorylation by ATPases. ADP is converted back to ATP by ATP synthesis
ANS	Autonomic nervous system
ASC	Altered State of Consciousness zone of homeostasis
ATP	Adenosine triphosphate, the main energy storage and transfer molecule in the cell
CNS	Central Nervous System
D wF and **D F**	Diagram without filter, and Diagram with filter, correspondingly
EF	Energy Field
EPC	Electrophotonic Capture
EPI	Electrophotonic Imaging
EPI wF and **EPI F**	EPI-grams taken without filter and with filter, correspondingly
F, wF	Filter, without Filter
GDV	Gas Discharge Visualization
HS	Health + Stress zone of homeostasis
JSR, JSL	Parameter "Integral Area" from the Diagram program
L	Left hand
R	Right hand
SD	Standard Deviation
H	Health zone of homeostasis
P	Pathology zone of homeostasis

Introduction

The current manual is for those who are actively working with EPI/GDV technology. In recent years, continuing research has accumulated a large volume of experimental data, and doctors have created patient databases with detailed analysis. This data makes it possible to formulate a number of new approaches and ideas. The main purpose of this book is to help experts, doctors, psychologists and researchers to interpret EPI Bioelectrography data. Considering the diverse levels of training and qualifications among our readers, we have tried to present the information simply and directly, and without the use of specialized terms and mathematical expressions wherever possible. For this reason, we only touch briefly on the question of EPI parameters and their use when interpreting data. This book is written in the style of a study aid aimed at learning and consultation rather than for light reading. The material is reviewed with many examples. By reading the book and looking at the images, you will easily assimilate the principle of EPI data analysis.

This book summarizes the work of hundreds of people busy with development, research and practical work in EPI Bioelectrography. It is not possible to name all those involved in this work, and it is difficult to single out individual contributions, which is why we would like to thank all those who gave of their energy, knowledge and spirit to create and develop the method of EPI Bioelectrography. Each year the circle of professionals using the EPI method in their work widens, and new research opens undreamt of horizons. We are sure that these are but the first steps in the vast new continent which is opening itself up to us.

From 1996 every July in Saint-Petersburg Russia International Scientific Congress "Science, Information and Spirit" hosts hundreds of professionals and interested people from all over the world. Several workshops dedicated to GDV technology are being held every year in different countries. As Professor Albert Krashenjuk sad: "We can name quite a few new scientific lines which may host scientific congresses every year for 15 years". We welcome everybody to Saint Petersburg every July in the time of White Nights and scientific celebration.
We appreciate any comments and updates. Please contact us via
www.bio-well.eu and www.ktispb.ru

Highs and Lows of Modern Medicine

The miserable have no other medicine
But only hope

William Shakespeare
Measure for Measure, III, 1

Medicine at the beginning of the XXI century

Western medicine has achieved tremendous breakthroughs by the beginning of the XXI century: major infectious diseases have been defeated, surgeons perform heart and kidney transplantations on a daily basis, modern computer technologies allow monitoring human organs in vivo. Glimmering displays, subtle biochemical and genetic analyses, a vast inventory of medicines and drugs. One would think that all diseases must retreat before this multibillion dollar onslaught. However, this is far from the truth.

At the beginning of the XXth century various infectious diseases, as well as other acute illnesses, prevailed; however, by the beginning of the 21st century the leadership went to chronic and systemic disturbances of health. And the fact that people in developed countries have a longer average lifespan now is not accountable for this – many diseases that previously were common only for elderly people have suddenly grown much 'younger.' In particular, childhood diabetes is becoming more and more common, whereas only 2 or 3 decades ago it used to be an extremely rare disease. Recent studies showed that almost 20% of American children and teenagers have their coronary arteries affected by atherosclerosis plaques. In Scotland, the incidence of autoimmune diseases among children and teenagers has grown twofold during the past 10 years. In Russia, not more than only 12% of primary school students and not more than only 5% of secondary school students are absolutely healthy. The majority of children suffer from chronic diseases. The number of children suffering from cardiovascular diseases, for example, has grown increased by more than a half during the period from 1989 to 1998. Many of such these children have been disabled since their childhood.

The number of people suffering from various allergic diseases is growing fast. The disease incidence has grown by 30-40% as compared to the previous

decade, and in some countries as much as a half of the whole population manifests classic symptoms of allergy. More and more people are suffering from chronic skin diseases with uncertain causes, such as eczemas and psoriasis, and from various smouldering inflammatory diseases of internal organs, joints and musculoskeletal system, to the and irritated bowel syndrome and other chronic diseases of the gastrointestinal tract. 26% of the USA population and 41% of the population of Great Britain manifest symptoms of the digestive disorder (dyspepsia). In a significant number of patients, non-ulcerous dyspepsia later transforms into serious organic lesions, sometimes even cancer. For many patients, the chronic course of somatic diseases is complicated with a tendency towards neurosis and depressions. In many countries more and more patients are diagnosed as having such major systemic disturbances as the chronic fatigue syndrome, seasonal depression, and the syndrome of childhood hyper excitability hyperactivity with distracted attention deficit disorder.

Until recently, not all physicians regarded the overweight or obesity problems as clinically significant diseases. Now the correlation between being overweight and having serious chronic disorders is becoming obvious evident. 30% of the adult population and 50% of the elderly population of developed countries have body weight substantially above healthy standards, and the problem keeps getting worse. Medical statistics of the USA say that 45% of all patients suffering from hypertension, 85% of diabetics and 35% of all ischemic heart disease patients are obese. The mortality rate of obese cancer patients is 30-50% higher than the average mortality rate of patients with normal weight, and for such cancer types as the rectal or prostate cancer in men and endometrial cancer in women the difference associated with obesity is fivefold.

Thus, a typical present-day patient is chronically ill, usually with diseases that afflict several physiological systems at the same time. Quite often, placing a disease within a certain class, for example the class of cardiovascular pathology or diabetes, reflects only a set of the most pronounced symptoms, whereas what happens in reality is the reciprocal influence of various pathologic manifestations, which significantly complicates the diagnostics. The systemic nature of chronic diseases and their polyetiology (or, most likely, uncertain etiologies) seriously encumber both prevention and treatment of such diseases.

This situation is no coincidence. It results from the main concept of the Occidental Allopathic medicine – treating the disease, and not the person. Each field of medicine concerns itself only with particular organs or systems; each physician offers his or her own special set of medicines – extremely strong chemicals that influence certain regulatory processes of the organism. Simultaneous prescription of several drugs without clear understanding of the nature of their interaction is quite common. Official statistics tell us that in the USA 97,000 patients die every year due to errors in prescription of drugs.

"*Living organisms are just incredibly complex machines*"

R.Dawkins. The Selfish Gene. 1993

This point of view, expressed by one of the leading most widely read genetic theorists of modern time, became prevalent in medicine and biology as early as in the end of the XVIII century, and originated from the vigorous progress of technical sciences based on mechanist, reductionist and chemical approaches. Breakthroughs in chemistry in the XIX-XX centuries gave rise to an illusory idea that processes within the organism can be controlled just like reactions in a test tube.

The whole entire XX century passed by the motto with a goal of refining our knowledge of molecular processes in biological systems. New subtleties of chemical processes kept surfacing, new classes of substances roused enthusiasm of in the scientific community and the Nobel prize committee, and industry responded by creating more and more new classes of synthetic drugs. Each year promised the general public that all diseases would be cured, as soon as the clinical tests of yet another 'Kremlin pill' are completed. The epic project for mapping of human genes played a very important part in this industrial and financial race. Genetic drugs have already begun their assault on the purses of consumers, not to mention genetically modified foods.

The extent of the threat that these achievements pose for the health of humanity can be assessed merely by looking at the population of the most prosperous country in the world – the United States. The number of chronic childhood diseases is growing there every year, and in the USA a situation when a person can no longer fits into a standard chair, or requiring an extension of the automobile or aircraft seat belts by means of extra straps, is now considered quite normal. The USA population has already become genetically modified in many ways.

The number of synthetic medicines is ever increasing, the prices keep on growing, the production volume of pharmaceutical business has outdone the heavy engineering industry, and this business has no time for the individual person, with his/her particular problems and stresses. A human being is replaced by a diagnosis based on the set of symptoms. And then the diagnosis is treated, not the individual. This Any particular John Smith can only get in the way of the process with his emotions. The only exception to this rule is possibly the infantile paediatrics, since because paediatricians monitor the development of a child.

Thus, until you have strongly pronounced symptoms of some disease, turning to the classic Occidental Allopathic medicine is pointless. No one will even listen to you.

Principles of the systemic approach in biology

At the same time, in the beginning of the past century Russia became home to a new line of thought that regarded the condition of a human as a systemic issue, and the life in Universe as a structural process.

> *"Synthetic study of natural phenomena – its natural bodies and the nature itself as a 'whole' – inevitably reveals some structural properties that are left out when taking an analytic approach and gives new insights. This synthetic approach is now quite popular, both within scientific and philosophic pursuits. The most noticeable result of this approach is the fading of borders between sciences – we perform scientific study of problems with no regard for scientific limitations."*
>
> Vernadski V.I.

> "*Life is an uncontainable, structured, goal-oriented process."*
>
> Gurvich A.

In 1935 Bauer formulated the fundamental functioning principle of biological systems and called it "***the principle of the permanent inequilibrium***."

> *"All and only the living systems are never in equilibrium and are using their free energy for continuous work against the equilibrium that is required by the laws of physics and chemistry under current external conditions."*
>
> Bauer E.

According to Bauer, this principle arises from the three main postulates, to which the living systems must conform.

- First, "all living matter is characterized, first of all, by self-induced changes of its state, i.e. changes of state that are not caused by any external factors outside said living matter."
- Second, "in any kind of environment all living matter works against the equilibrium that should take place within given environment for the given initial condition of the system."
- Third, "upon any kind of external influence and, therefore, upon any change of the environment, the system must perform work that would influence the alterations of state induced by said external influence, thus changing them."

The described principles correlate with modern ideas on self-organizing systems, developed by the schools of I.Prigozhin and G.Haken. According to S.E.Shnol – a prominent Russian biophysicist – the following is directly related to the problems in question:

1) thermodynamics of irreversible processes;
2) information theory;
3) bioenergetics (ways and mechanisms of energy transformation in biological processes);
4) physics and physical chemistry of biologically important macromolecules.

This list should also include the concept of cyclic influences of cosmic processes in biology, especially by the Sun. The prominent Russian scientist A.L. Chizhevskiy was the first to draw attention towards these issues. He developed and validated the principle of 'cosmic determinism' – the dependence of terrestrial biological cycles on Earth on the cosmic activity.

> *"We are used to the crude and narrow-minded antiphilosophical idea of life being the outcome of a random interplay of solely terrestrial forces. This, of course, is wrong. We can see that life is more of a cosmic phenomenon than an earthly one. It has been created by the influence of creative dynamics of the Cosmos on the inert material of Earth. It lives by the dynamics of these forces, and every organic pulsation is harmonized with the beating of cosmic heart – the enormous congregation of nebulae, stars, the Sun and the planets".*
>
> Chizhevskiy A.L.

Nowadays these issues have been extensively studied by hundreds of scientists all over the world and do not longer cause such controversy as in Chizhevskiy's time. Ideas of the rhythmic of life in all its manifestations – from an individual person's cycles of activity, such as neurohumoral and endocrine processes, to the macro scale rhythms of the society – have permeated all layers of society and received public recognition. All the more, we have increasing understanding that those rhythms are directly related to our everyday life and health.

Fundamental trends of medicine of the XXI century

It is becoming obvious that the XXI century calls for a new medical paradigm, a new approach towards health and treatment.

Many physicians and researchers have been developing the principles of this new approach; in particular, these principles are described in the book *Logic of Health* by the Moscow physician Anatoly Volkov, who based his book on years of medical practice and treatment of hundreds of patients saved from the most serious illnesses.

- "*Health is an optimal state of the organism that implies adequate reaction of the organism towards any kind of external stimuli.*
- *A human organism is a self-regulating system that may be corrected just a little, but must never be regulated from outside.*
- *An organism that provides an adequate response to external stimuli does not need any drugs. Therefore, medicines and drugs should only be used for emergency medical treatments.*
- *Any treatment should aim at restoring the natural level of the organism's adaptability to external stimuli, except when some functions of the organism have been irreversibly lost.* "

We can see that these ideas have a lot in common with the views of great ancient physicians, from Hippocrates, Galen and Roger Bacon to the Eastern philosophers – Israeli, Chinese, Korean and Indian.

What is happening today in the modern European world is a gradual return to those ideas, to a wider understanding of the nature of human beings and our place in the Universe.

In the Western industrial countries this process has led to the creation of new medical trends that still have not been properly structured and sometimes do not even have a universal name.

ALTERNATIVE MEDICINE.
COMPLEMENTARY MEDICINE.
INTEGRATIVE MEDICINE.
ENERGY MEDICINE.
HOLISTIC MEDICINE.
SYSTEMIC MEDICINE.

These titles can be seen in journal captions, in names of professional communities, in lectures at international conferences. Although there is still some confusion about the name of the trend, the trend itself has already grown mature, has manifested itself and proved its right to exist. This "novel" medicine employs an overwhelming variety of methods: from acupuncture, homeopathy, electric and magnetic therapy, to psychosocial and informational stimulations. All these different approaches are united by the one main principle – the idea of a human as a unified system, and the concept of influencing the whole hierarchy of processes uniting the material body, mind and soul.

> *A human being is neither a machine, nor a computer, nor a chemical laboratory – it is God's creation, the summit of evolution of biological life on Earth.*

This changes the whole goal setting of medicine as a practical discipline. The main purpose of contemporary Occidental Allopathic medicine is to cure diseases. At the same time, all physicians understand that terminating a malignant process at an early stage is much easier than doing so during acute manifestations of pathology. Many people could have been saved from heart attacks or strokes if underlying corresponding processes had been secured and understood prior to clinical manifestations. The majority of tumours discovered at early stages can be successfully treated with contemporary methods.

> *Therefore, one of the main tasks of the XXI century medicine is the creation of a system of early diagnostics and disease prevention, in other worlds – the transition to individual preventive medicine, a medicine of health. Preventing diseases rather than treating them – this is the goal of the 'new' medicine.*

Everything new is old again, the saying goes. The concept of prevention has always been the foundation stone of the Eastern medicines. In ancient China, a family physician received payment only as long as all family members were healthy. Whenever someone fell ill, the payment stopped. No wonder that physicians went to great pains to preserve health of their patients. In contrast, in the Occidental Allopathic medicine we pay physicians when we are ill and consequently... (one does not wish to draw offending conclusions). Part of the Eastern health system consists of meditation techniques, relaxation exercises, massage and hydrotherapeutic procedures – our contemporary medicine has only started to approach this. A whole complex of procedures had been developed for ensuring a healthy life in old age, whereas we have only started assimilation of such methods. Another important thing is that the methods of systemic, integrative, alternative medicine employ only natural ingredients.

Modern synthetic drugs prove effective in the vast majority of cases, especially when saving the life of a patient or turning the tide of a health crisis. Not to mention such drugs as Viagra. Contemporary medicine is a battlefield, when one has to save a patient's life, without giving much thought to possible secondary consequences.

Natural medicines operate in a much milder way. As a rule, they do not provide an immediate intense effect; they do their job over time, slowly but persistently and successfully. Plant-based medicines can cure chronic illnesses or prevent them from arising in the first place. Small doses of such medicines do not cause addiction or dependence, while functioning in an efficient manner over long-term periods. Apparently, natural substances have something that chemists just cannot synthesize. It might be the systemacity, the complexity of microcomposition that disappears after they isolate the apparently active element.

We have conducted a large series of experiments, comparing the glow of natural aromatic oils against their synthetic analogues with identical mass spectra, i.e. having virtually identical chemical composition. In the majority of cases the glow dynamics of natural oils and their synthetic analogues differed. Therefore, natural products do contain some elusive element that chemists cannot determine, that gives the natural apple its flavour and provides flagrance to the blossoming rose. Maybe it is a good thing chemists cannot find it. Or we would be eating paper smelling like steak. Having McDonald's everywhere is already quite enough, thank you very much.

So, the first stage of treatment in integrative medicine is the assessment of the health condition. It must include several elements:

- Biochemical blood assay;
- Genetic status;
- Cardiac monitoring, preferably under load;
- Blood pressure monitoring.

Analysis of the biological energy emanations by means of the EPI method, with assessment of the psychological state and the level of stress.

Depending on the result of these analyses, the physician may then prescribe a systemic treatment or recommend detailed examination of particular organs or systems.

The concept of a biological field

The issue of instrumental analysis is even more urgent in the field of psychophysiology. The developed methods of instrumental methods to study of an individual's psychophysiological state have a long ago started to appeal to researchers' history. After the first experiments of Gustav Fechner, it became obvious that psychology is inextricably linked with physiology, that body and soul form a continuous and inseparable entity, a unified system that defines this particular human being as an individual in his/her social interactions, psychological and physical realities.

When we accept the idea of a multilevel structure of a human being that is discussed in great detail in our publications, we come to understand the inseparability of the psychological and the physical and the physiological parts. We may represent this connection by means of a simple diagram:

Soul => Brain => Nervous system => Physiology
or, in other words:
Spirit => Consciousness => Soma

Only when a person lives for his/her soul, enjoying the company of friends and relatives, enjoying his/her occupation, he or she can truly appreciate life, in all its fullness and perfection. That is why the concepts of spirituality and

metaphysics inevitably penetrated the contemporary Occidental science and stimulated profound discussions at professional scientific forums.

> *"Psychophysiologists should not try to avoid the concept of a soul. Soul incorporates intellect and mind, as well as the most important thing – the experience obtained from phenomena of the world around us... In other words, the difference between a professional and a specialist lies in the ethical core of the individual."*
>
> V.A.Ponomarenko, M.D., Professor,
> Member of the Russian Academy of Education.

The accumulated experience of the past years supports a conclusion that the concepts of spirituality and physiology can be usefully reflected by studying of the biological field. Following the use of this term after by A.G. Gurvich, we use the concept of biological field not as a metaphysical abstraction, but as a measurable psychophysical object. The Electrophotonic Imaging (EPI) method is one of the several possible ways of studying a biological field.

For the time being a reasonable approximation would be to view the aura as an energy field, more properly a field that can be represented by a stress-energy tensor which is not in Einstein-Minkowsky space-time; it is to form structures in physical reality but only partly in physical space-time.

Numerous publications by scientists from different countries have shown that the analysis of Electrophotonic images allows registering the radiation activity from the biofield of any organism. The biofield emitted by the organism has a holographic structure, but it does not represent a constant, rigid formation – rather, it is a living, fluctuating, breathing cloud, concentrated in a particular area of space, but not limited by any rigid borders. The glowing halo around the body of an individual or his/her particular organs, for example an EPI-gram taken from a finger, remains constant and stable for a certain period of time and, therefore, two images taken with only a small delay will look almost the same. But now the individual starts thinking about how an upcoming meeting is going to take place – and the glowing image of the EPI-gram changes, it shivers and a gentle wave passes throughout the structure, touching its every section. They are like clouds – on a gloomy day clouds are stable, but we can detect changes even within this stability. Therefore, the biological energy of humans reacts to ideomotor images and mental pictures, and an EPI-gram can be useful for psychophysiological diagnostics of an individual's state.

What is Consciousness?

"I sent my Soul through the Invisible,
Some letter of that After-life to spell:
And by and by my Soul return'd to me,
And answer'd "I Myself am Heav'n and Hel"

Omar Khayyam (1048-1131)

First step in science is to give a definition. People often argue for hours about certain topics, defending different positions, but in reality, they are talking about different things: everyone keepS in mind his or her own understanding of the topic. So let us start with definitions of what we understand by the term "Consciousness".

The history of attempts to build a rigorous, not intuitive definition of consciousness is rooted in the distant past. Moreover, all these attempts are inevitably based on an a priori division of the whole of nature into conscious and unconscious: the definition should only formally draw this border exactly where expected. Depending on this, the authors of the concept make statements about the adequacy of the specific wording. Definitions based on this division, are subjective and, biased, most often in favor of Homo sapiens. With this approach, avoiding logical tautology is not possible in principle.

Furthermore: being the foundation for experiments, such an approach to the definition of consciousness inevitably leads to incorrect results. Thus, in the well-known experiment the experimenter removes the bell from the entrance to the wasp nest, and the wasp completes a new one. Further, he makes a hole in the tube bend before the bell, and the wasp builds both the tube, and the bell. "Aha!" says the experimenter, "Now you see, the wasp has no reason!" But if aliens, as an experiment, make a hole in somebody's trousers over and over again, the person will first try to patch them, then he will buy new pants, but eventually he will throw them out of the window, swearing and pounding his feet. "Aha!" the alien will say, "Now you see, Man has no reason!"

The reason here is that we assume a priori which behavior is reasonable and which is not. Experimenting not on ants and wasps, but on a man working on an assembly line, you would find just as strong evidence that he is no more than a biorobot. The entertainment industry and a TV

program guide can provide us with even more impressive indication of the total lack of human reason.

In our studies we use the following definition:

Consciousness is a property (ability) of natural objects to form abstract representations of the outside material world, suitable for use in purposeful activity through sensory perception.

In more simple form:

Consciousness is the ability of a subject to react to environmental information and change its behavior in accordance with this information.

From this point of view, every living organism possesses consciousness: all animals, large and small above ground and under, in the air and in water; plants; microorganisms and every cell of our body. At the same time, inanimate subjects do not possess consciousness: stone may be warmed by the sun, but it will not move or change its color to avoid overheating.

But how about robots – in accordance with this definition the best of them ~~samples~~ possess consciousness?

From our point of view, robots replicate elements of the consciousness of their creators. Living beings are able to modify their features in case of rapid changes in circumstance even at the cost of death of part of the population. Of course, to some extent: out of millions of years during the kingdom of dinosaurs only crocodiles were able to survive. Robots may behave in accordance with a program, designed by engineers, and their ability to modify is quite limited. At least, within the limits of known technologies.

All discussions above are related to **the first, basic levels of consciousness**.

Next level of consciousness is the ability of a subject to predict future events, remember past events, plan and modify its behavior to meet future situations in accordance with their experiences.

This level is characteristic of ~~for~~ higher animals and humans. All owners of cats and dogs know that their pets may be very smart when it comes to not only their favorite food, but often to their relationships with their masters. Interesting examples were presented in the book by Rupert

Sheldrake "Dogs That Know Their Owners are Coming Home" (1999). Seven experiments demonstrated that dogs were able to predict their masters' return and were waiting near ~~by~~ the door. We know many stories about conscious behavior of dolphins and elephants, not to mention monkeys and crows. All mentally healthy people have this level of consciousness, albeit to different extents. Children possess this level at the age of two-three years.

With these first two levels, we may associate the notion of **Group Consciousness.** This is typical for animals' kingdom, from bees and ants to wolves, buffalo and deer. Same as it is typical for first stages of human organization on tribal level. Group Consciousness allows them had better chances for survival in a hostile wild environment, and for most of these species, it is impossible to subsist without the group. But this is very conservative rigid structure, which does not presume further development.

Next level of consciousness is the ability to generate new ideas, exchange these ideas with others, transmit them to next generations and manifest them in objective reality.

Only humans possess this ability. Ants build their huts in the same way for millennia, as do bees, birds and many other animals. We cannot explain how they achieved this ability, who taught them, but they never changed the structure of their constructions. Very rarely do they introduce new elements acquired by random trials. For humans, creativity is the basis of the development of civilization. Artists, poets, architects, scientists, and many other creative people have advanced our civilization, and the whole of today's modern world is created only through the constant generation of new ideas. Some people generate new ideas, others turn them into reality. Many smart people reach this level of consciousness in their work, which allows them to take everyday decisions, based on knowledge, experience and intuition. All successful business people, politicians, teachers, engineers, builders and many other professionals have to generate and use new ideas in their everyday practice. It is so common, that people often do not pay attention to this process. But only in this way can humankind develop and create new steps in our civilization.

A high level of consciousness is the ability to generate ideas, which are not based on the existing level of social development and knowledge and which transforms society, moving it to the next level of civilization.

All known and unknown to us geniuses of human civilization at this level. They were creating in different fields: art, architecture, music, science, and we can easily distinguish outstanding names in every epoch. Their achievements were connected with the previous level of the development, but did not follow logically from this level. Presumably, they did it by connecting to the Universal Information Field. Every one of them was creating something correlated with the particular level of civilization development, but much ahead of their contemporaries. So very often they were not fully praised in their times. Antonio Salieri (1750-1825) had much more successful career than Mozart (1756-1791); many of the impressionists died in poverty; Russian mathematician Nikolai Lobachevski (1792-1856), the creator of non-Euclidian geometry, was ridiculed during his life; Dmitri Mendeleev (1834-1907), the creator of the Periodic Table of the chemical elements, was not elected to the Russian Academy of Science. We may give multiple examples of this kind, but now their names are written in the Golden Book of Human Geniuses.

And, finely, the highest level of Human Consciousness.

Ability to accept direct information from the Higher Planes of Consciousness and convey this information to other people.

We can name particular people in known to us history, who was able to reach this level. First of all, these are Great Spiritual Teachers, like Moses, Zarathustra, Buddha, Jesus and Mohammed. They were able to give people new understanding of their lives; formulate spiritual laws, which govern millions of people for thousands of years. In different words, in different languages they were speaking about the same things – about human life, human soul and the role of humans in the Universe. Now we understand, that all religions give the same message, they all have the same spiritual content, same deep meaning. Great Teachers were able to present people complicated spiritual ideas in simple, understandable words. In A short time their teachings have been accepted by millions of people, because they allowed every individual to reach new levels of spiritual development. Moreover, all these teachings have existed for thousands of years, they do not die and they transform in accordance with the development of society.

We do not need to mix Spiritual Teachings with human institutions, Religious organizations are social structures, organized by particular people in specific socio-historical periods. They were initially designed to help people in their everyday needs, to help them survive harsh conditions, explain spiritual ideas in understandable words, but soon they were transformed into social institutions and have been used in the Power Games of Rulers. We know how many crimes have been conducted under the name of God, millions of people have been tortured and killed by religious fanatics, in religious wars, and this process is not over yet.

All we discussed above is related to individual consciousness, but we, humans, also possess a **Collective Consciousness**. We are the only creatures on Earth, which have both individual and collective consciousness. This is our powerful tool for development, for the creation of Civilization. We join our individual minds as neurons in the brain, thousand times increasing group intellectual power. Formation of civilization became possible only when people started living in big groups, when they formed first cities, generating extra products, which allowed more and more people not to be involved in the everyday struggle for survival. Combining their brains, their abilities, people were able to make the next steps in civilizational development. We'll discuss this topic in the following chapters.

Of course, our definitions are only some of the possible way to discuss consciousness. You may find many different approaches in modern science. Our aim was to give definitions, which we may use in our research, developing experiments, which may help us to understand some enigmas of human existence.

The more we perceive the world around us, the more it startles us by its complexity. The boundaries of our knowledge are continuously moving aside, making the process of cognition in the ongoing race, beyond the horizon. On this way, many obvious and universally accepted theses periodically become paradoxical and ambiguous; many representations die or radically change. The true way of all science goes through crises and paradigm shifts to new crises. This path is endless, convoluted and tortuous, but there is no other way.

A direct mechanical transfer of representations from the ant-hill to human society is impossible; however, the study of these "parallel

worlds" can give the same long-anticipated push for a new round of scientific development predicted by many scientists of the planet.

Consciousness is the ideal category, the basic imperative along with Matter and Information. In modern sciencewe do not have – either in medicine or in biology - the notion of consciousness; we only take the first steps in understanding this concept. Obviously, even just a transition to micro or macro-world is accompanied by changes in ideas about what consciousness is, as it is difficult to talk about any expected behavior. From a bird's eye view, people's behavior on the streets of a city, observed in time lapse is strangely reminiscent of an anthill or a beehive.

A worker on an assembly line, at first glance, behaves in the same way as an ant. However, this is only a superficial similarity. The assembly line for a worker is only one of his numerous functions: he can also be the caring father of a family, an angler, a collector, a reader of novels, a spectator, or a member of a political party. When conditions change, the worker can respond irrespective OF ~~to~~ his work program, and even in spite of it. The worker can go on strike and demand change in his conditions. We know nothing about the strikes of ants. Therefore, it is beneficial to replace the worker with a robot, whose behavior is fully consistent with the ant psychology.

It is noteworthy that the rigid structure of a collective, being surprisingly stable for ants and having ensured their survival for hundreds of millions of years with all the changes in the environment, turned to be totally unsustainable for the human society; even being forcibly established and guarded, it spontaneously disintegrates in an historically short term. We may see in history that any Empire exist about 1000 years, and then disintegrates, being replaced by a new Empire. We observe this pattern throughout all human history, regardless of nation or continent. Some social formations exist for much shorter periods, just seconds from an historical perspective. The socialist system existed for 70 years, and quietly broke up without any pressure from outside. It is obvious that with the suppression of the Individual Conscience in the name of the Collective in human society, the fundamental laws of life of the noosphere, the laws of the stability of a complexly organized system are violated. The Communist model of the structure of a society is perfect for protozoa and insects; however, all attempts to introduce it for people, - beings with a more complex organization,- are not viable.

We did not mention such notions as “unconsciousness”, “subconscipusness” and “superconsciousness”, obligatory in modern psychology. You may find thousands of books discussing these topics. We presume that readers understand their meaning. The reason is these are descriptions of brain functioning, interrelations between different parts of the brain, in particular, left and right hemispheres, in the processing of received information. It is well known that we take in much more information, than we are aware of. The brain processes all the information and presents to our attention only a small part of it. This process depends on a person, the situation at the time and the importance of the information. Intuitive people may process much more information from the environment compared with less intuitive ones. In our definitions, this is related to activity at different levels of consciousness. I would say, they describe inner mechanisms of informational processing, while in our definitions we are focused on the outcome of this process.

In addition, it makes us look differently at the definition of the concept of “consciousness”. This notion is a key in the area of sciences related to man. The basic concepts of any scientific theory are primary, i.e., are not defined in terms of other previously introduced concepts, but are introduced intuitively. They define the whole future course of possible arguments; a good example is to recall how different is the geometry of Euclid and Lobachevsky- Riemann, with different primary definitions.

These arguments inevitably lead us to a contradiction: an intuitive introduction of a term suggests that its meaning is equally understood by all who use the relevant theory. The concept of consciousness is complex enough already to demand that it expresses itself (I cannot but recall the famous theorem of Gödel's incompleteness of formal systems, which establishes the impossibility of judging the properties of a system by means of the system).

At the same time in everyday life, we define the concept clearly enough. We say:

- “a conscious man” about the individual who understands the nature of his actions and their possible consequences. From this perspective, neither a drunkard, nor a criminal can be called conscious people. Their behavior is contrary to the moral standards of society. Thus, we see that the term “conscious” has a moral and ethical

connotation and refers to people who understand and control their behavior in society. At the same time:

- an "unconscious behavior" is the state when a person acts without controlling his actions and does not understand their consequences.

A whole range of states can be between these two extreme situations. One popular option is when a person is aware of all that happened, but acts in a completely unexpected way, both to him and to others. For example, spouses during a family quarrel can say things to each other, for which they will be very embarrassed. In a crowd of fans a man can cry, fight and smash benches, although in real life he is quite a peaceful citizen. Another extreme is the phenomenon of "out of body experience" when a patient being on the operating table under general anesthesia, watches everything that is going on though detached from the event.

Thus, to avoid all these difficulties, in modern science it is customary to speak of a "normal" awakened consciousness and various deviations from this state. Thus, the "normal" consciousness is the individual's ability to perceive events and respond in accordance with the level of socio-cultural environment.

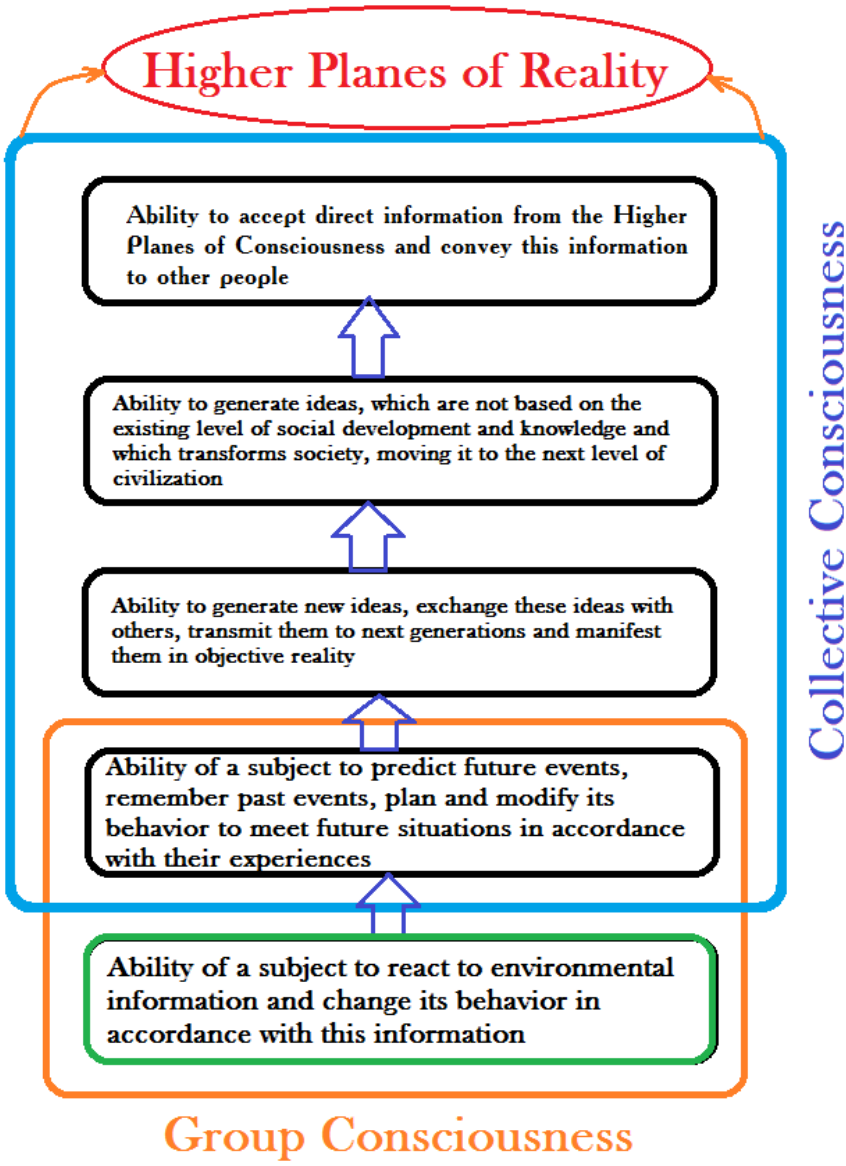
Hence, is consciousness associated with the level of social development? Yes, of course. For the man of XIII the appearance of a living dragon would be perceived as something natural, though with fear. We can assume that in those times dragons were common wild animals, like wolves or bears. These dragons crawled in those times, and now they preserved only on the island of Komodo. For a modern man the appearance of a dragon will be perceived as a hallucination, or as part of Disneyland. In this context, the above definitions of "consciousness" should not be viewed as an attempt to constructively identify this philosophical category, but as a way to agree on the meaning embedded in the concept. It can be understood as the coordination of intuitive ideas, a sort of "check of the clocks".

To introduce consciousness into scientific framework we need develop a theory of its operation, which would be able to explain different levels of consciousness and predict some new phenomena, such as distant healing, mediums and out-of-body experiences. Now the most promising seems to be theories based on quantum electrodynamics. We need to accept consciousness as a system effect, depending not on

the particular part of the body, even one as powerful as the brain, but on the system as a whole. We may attribute some level of consciousness to every cell of the body or to the particular organ, but to achieve high level of consciousness we need coordinated activity of all the cells, all the organs. Quantum electrodynamics operates with the notion of a system, consisting of many elements, that is why it may be applied to the construction of the theory of consciousness. You may find many papers, published on this topic, and, without being a mathematician, it is absolutely impossible to understand their importance and meaning. Interested readers may refer to the works of Mari Jibu, Kunio Yasue, Emilio Del Giudice, Giuseppe Vitiello and some other prominent theoreticians. Good luck and I praise you if you will be able to understand their content. We may only believe that at some stage they will be able to construct a self-consistent theory of consciousness. I will let you know when it will happen...

Fig 1 presents main ideas on the Levels of Consciousness. Group consciousness is typical both for human and for animals, in particular ants, bees, termites, fish, etc. At this level, individual elements cannot exist without group and group behave as a separate organism consisting from many separated particles, bound together by collective bonds. Tribal system is organized on this principle as well.

Collective consciousness (collective unconsciousness after Jung) is driving force of human civilization. Here every individual has his/her own highly developed consciousness, but only combining their consciousness by the Informational Field, we create conditions for the development. By the Informational Field we understand all possible means of informational exchange: verbal, printed, transmitted by electromagnetic fields and via Internet, transferred by quantum effects.


Higher Planes of Reality
Ability to accept direct information from the Higher Planes of Consciousness and convey this information to other people
Ability to generate ideas, which are not based on the existing level of social development and knowledge and which transforms society, moving it to the next level of civilization
Ability to generate new ideas, exchange these ideas with others, transmit them to next generations and manifest them in objective reality
Ability of a subject to predict future events, remember past events, plan and modify its behavior to meet future situations in accordance with their experiences
Ability of a subject to react to environmental information and change its behavior in accordance with this information
Collective Consciousness
Group Consciousness

Part I

General Principles of Electrophotonic GDV Analysis

Ignorance is the curse of God,
Knowledge the wing wherewith we fly to heaven.
William Shakespere
Henry VI, IV, 7

The glow from different types of objects in high intensity electromagnetic fields was detected over 200 years ago, and since then has attracted the attention of researchers (a literature review can be found in our previous books [Korotkov, 1995; 1998]). But it was only with the creation of gas discharge visualization (GDV) systems in 1995 that research into these glows gained scientific status. Since then, the physical mechanisms which make up the glow have been studied in detail [Korotkov, 2002], serial production of the devices has been established, and a system of software programs for applications in medicine, biology and research into materials has been created {Korotkov et al., 2001-2005]. It has been shown that the characteristics of the glow of a person's cutaneous covering depend primarily on the activity of the autonomic nervous system, with special consideration of the system of adaptation levels. Many research results are published annually in the materials of the St Petersburg Congresses on Bioelectrography *Science, Information, Spirit* (please, see www.korotkov.org). In parallel with **GDV** the term **EPI – Electrophotonic Imaging** – is also being used to name this technology.

EPI/GDV bioelectrographic systems have had practical applications in the following main areas:

Medicine

- analysis of a person's physiological state;
- analysis of a person's psychological state;
- monitoring the body's reactions during therapy;
- assessing the probability of organic systemic abnormalities;
- the presence of altered states of consciousness;
- assessing the risk of allergens according to EPI parameters of the glow of blood samples.

The GDV system is certified by the Ministry of Health of the Russian Federation as a medical technical device. Recently, the number of publications on the medical aspects of EPI analysis has increased.

Review of published papers on medical applications of EPI technology may be found in the book by E. Yakovleva and K. Korotkov, available from www.Amazon.com and www.bui-well.eu.

Sport

Assessing the level of performance alertness of athletes [Bundzen et al., 2003, 2005]. By order of the Ministry of Sport of Russia, an EPI system is being fitted into the practice of testing athletes. In Olympic and Paralympic Games Saoch-2014 EPI instruments were used in the process of sport teams training process [Drozdovski et.al., 2013,2014].

The EPI Sport System makes it possible to:

- **dynamically determine** the psycho-physiological potential of a sportsman so as to effectively control the level of functional reserves and the quality of health during the training process;
- **ensure** rapid diagnosis of resilience to stress and the quality of mental and psychological energy mobilization in order to predict the success of performance activities.
- **carry out** a differentiated rating assessment of the psychological and physical potential of a group of sportsmen studied for selection and training purposes, for making timely corrections in the training process.

Research into fluids and materials, including human interactions with materials

- clarifying the difference between natural and synthetic oils [Korotkov et al., 2004];
- assessing the quality of cosmetics [Vainshelboim et al., 2005]
- researching human hair [Vainshelboim et al, 2004];
- researching homeopathic remedies [Bell et al., 2003];
- researching precious stones and their influence on people [Vainshelboim et al, 2005];
- researching geoactive zones and their influence on people [Hacker et al. 2005].

Such a wide range of applications is dependent on the high sensitivity of the EPI method to changes in the emission parameters of the objects under study, when stimulated by a high-intensity electromagnetic field. These parametric changes are evaluated with information theoretic analysis, structural statistical assessments, and artificial intelligence methods.

Research in EPI Bioelectrography continues actively. Each year Ph.D. theses are defended, and collections of scientific works are published in many different languages [*Measuring Energy Fields*, 2004]. In July of each year, St Petersburg – one of the most beautiful cities on earth – hosts the international scientific conference ***Science, Information, Spirit***, welcoming doctors, scientists and specialists from dozens of countries. Over the last 14 years, these conferences have been convened under the aegis of the International Union of Medical and Applied Bioelectrography (IUMAB). This Union brings together researchers from 62 countries studying the practical implementation of the Bioelectrography methods, growing in number every year.

Technology

The science and protocol for the EPI instrument was developed by a team of internationally renowned physicists, physicians, programmers, and technicians. Currently, there are more than 70 on the staff (more than half with doctorate degrees) based in St. Petersburg, improving and expanding the software and managing the database. The founder, Konstantin Korotkov, comes from a long line of doctors and scientists. With a dozen books to his credit, and guest lectures virtually each month, Dr. Korotkov is well known to

many, including the US National Institutes of Health, where he has presented his techniques to an enthusiastic array of doctors and scientists.

The EPI system has been approved by Russian Health Authorities for general use, following clinical trials and the recommendation of the Russian Academy of Sciences. It utilizes almost instantaneous, non-invasive and painless measurements and sophisticated interpretive software with comparisons to an extremely large and reliable database assembled over more than 10 years. This technology has far reaching diagnostic and human performance applications.

The system provides non-invasive, painless and almost immediate evaluation which can highlight potential health abnormalities prior to even the earliest symptoms of an underlying condition, and suggests courses of action. These may include identifying an area for further medical exploration, suggesting products that may be beneficial (such as vitamins, minerals, supplements), or evaluating energy, stress and vitality. In each case, the EPI scan can provide significant information and suggestions.

EPI utilizes a weak, completely painless electrical current applied to the fingertips for less than a millisecond. The body's response to this stimulus is the formation of a variation of an "electron cloud" which emits light energy photons. The electronic "glow" of this discharge (invisible to the human eye) is captured by an optical CCD camera system and then translated into a digital computer file.

The data from each test is converted to a unique "Photonic Profile," which is compared to the database of hundreds of thousands of data records using 55 distinct parametric discriminates, and charted so that it is available for discussion and analysis. A graph of the findings is presented as a two-dimensional image. To study these images, fractal, matrix, and various algorithmic techniques are linked and analyzed. In addition, the system provides instant graphic representations of the data to provide easy reference and interpretation in an understandable and meaningful manner; a further graphic representation is generated, placing the indicators within the outline of the human form, for ease of explanation and discussion.

Advantages of the EPI/GDV bioelectrography technique

The system is easy to use. The analysis can be totally computer-generated and the procedure does not require certification to administer. The system automatically indicates if the images being recorded are acceptable (fingers properly on the pad, no shaking or moisture, etc.), so the results can be analyzed and stored.

The technology complements virtually all existing treatment philosophies and specialties. The EPI System is a screening tool that identifies weaknesses in the human body and allows practitioners to more quickly and efficiently focus on areas of treatment, as well as providing a comprehensive method of tracking success.

- screening evaluation of the psychophysiological state and functional activity of an individual;
- noninvasiveness, safety and complete sterility of the technique;
- assessment of the anxiety and stress levels;
- quantitative information on the energy homeostasis level both for the organism as a whole and for individual functional systems;
- monitoring of an individual's reaction towards the influence of various treatment procedures, allopathic and homeopathic medicines, and mild informational influences;
- possibility of tracking the evolution of various processes in time and comparing structural, functional and time processes that take place in the organism;
- objectivity of the information – independence from the preferences and experience of the user;
- simplicity and convenience of the method – absence of any particular requirements for the room, the environmental conditions or the qualification of the personnel; during the investigation of an individual's state only measurements from his/her fingers and toes have to be taken;
- the equipment is relatively cheap.

Indications for the application of the GDV technique

The use of the medical technique of computer EPI/GDV Bioelectrography is advisable during screening examinations, conducted with a view to providing timely and controlled primary prophylactic actions. The application of the technique is also expedient for monitoring the functional state of the organism during treatment and rehabilitation, for preventing the side effects of various therapies, for determining additional indications for allopathic, non-drug and homeopathic treatment methods and providing a more objective assessment of their effects.

Material and technical support

Now we have available 3 different types of GDV/EPI instruments:

- GDV Bio-Well instrument;
- GDV Pro camera; and
- GDV Express camera.

Bio-Well is a revolutionary, non-intrusive way to measure human energy field using a specialized camera and software system. Bio-Well has been developed by the team of Dr. Konstantin Korotkov and brings the powerful technology known as Gas Discharge Visualization (GDV) technique (www.ktispb.ru) to market in a more accessible way than ever before. The product consists of a desktop camera and accompanying software, which allows a user to quickly and easily conduct human energy scans. When a scan is conducted, a weak electrical current is applied to the fingertips for less than a millisecond. The object's response to this stimulus is the formation of a variation of an "electron cloud" composed of light energy photons. The electronic "glow" of this discharge, which is invisible to the human eye, is captured by the camera system and then translated and transmitted back in graphical representations to show energy, stress and vitality evaluations. Each scan returns a wealth of meaningful information to provide you with a truly holistic view of the state of your wellbeing.

Bio-Well is not a medical instrument. It gives you an impression of your Energy Field and allows to see its day-to-day transformation and the influence of different situations and stimulus to your HEF and hence, to your condition. Friendly software makes data processing simple and convenient for non-experienced users. With Bio-Well you do not need to be a scientist to make full-scale scientific research!

In order to use your Bio-Well device, you also need an accompanying subscription. While the Bio-Well device captures the scan images, the subscription is the bread and butter of the system. It allows access to our complex algorithm that transforms your scan images into truly meaningful results. You may take images being off-line, and being on-line, you will get all the information. You can choose from three levels of subscription depending on your needs.

Download free software from www.bio-well.eu or www.bio-well.com and view demo accounts. Bio-Well subscription ($10 per month) allows you to make scans, see Energy Fields, Chakras, Balance, compare your scans, print report and get free updates. Demo accounts: login: demo; password: demo.

Bio-Well subscription Plus ($15 per month) allows to use Sputnik sensor together with all abovementioned information. Demo accounts: login: demoplus; password: demoplus.

Bio-Well subscription Pro ($25 per month) gives access to all the information. Demo accounts: login: demoPro; password: demoPro.

With Bio-Well device you may scan Energy Field. The image, which we create in Bio-Well instrument, is based on ideas of Traditional Chinese Medicine and verified by 18 years of clinical experience by hundreds of medical doctors with many thousands of patients. The scanning process is quick, easy and non-intrusive... do it daily for best results! Get real time feedback on what factors - positive and negative - affect your energy state. View each scan in a variety of interesting ways with up to 7 result display options. With the BioWell accessory pack add-on, measure environment and object energies too!

GDV Pro camera together with all options available with Bio-Well, allows to test different subjects like water, liquids, plants, gemstones and etc. Main

parameters of the camera may be adjusted in accordance with the properties of a subject under study.

GDV Express camera was designed for big centers and clinics; it allows to take Bio-grams of all 10 fingers of a person simultaneously. It is very convenient and impressive-looking instrument.

All GDV instruments may operate via Internet or with software stored at the computer. For more information visit www.ktispb.ru www.bio-well.eu and www.bio-well.com.

Scientific Evaluation

EPI has been used as the basis for significant research and in each instance, the reliability and value of the entire system has been confirmed.

- The EPI system has been presented at the USA National Institutes of Health to an audience of 27 world-class scientific investigators participating with Dr. Wisneski and Dr. Korotkov. This represented a diverse group of recognized experts from the US government and academic institutions.
- A Penn State study was conducted by scientists from the National Institutes on Aging, which validated that EPI can be used in high volume venues and accurately offer a consumer-friendly assessment of health status.
- EPI has also been the basis of graduate doctoral dissertations in various countries, which included research both in medical and technical fields. Short descriptions and analysis of published papers can be found in Appendix 1 of this book.
- Dr. Korotkov has hosted a series of annual international scientific congresses in Russia during the last 14 years, at which scientists from 46 countries have participated in and presented their research outcomes in a variety of research areas, utilizing EPI protocols, including some significant studies involving early cancer diagnosis.
- The meta-analysis of papers published in English or Russian language from 2003 to 2007 was presented in "The Journal of Alternative and Complementary Medicine". January 2010, 16(1): 13-25. *Korotkov*

K.G., Matravers P, Orlov D.V., Williams B.O. Application of Electrophoton Capture (EPC) Analysis Based on Gas Discharge Visualization (GDV) Technique in Medicine: A Systematic Review.

"All randomized controlled studies (RCTs) and systematic research reports (SRRs) were evaluated using Scottish Intercollegiate Guidelines Network and Jadad checklists. The search yielded 136 articles addressing four different fields of medical and psychophysiologic applications of EPC (GDV). Among them 78 were rated "high" on the two conventional checklists. **5303 patients** with different problems were compared to more than 1000 healthy individuals.

Conclusions:

1. The software and equipment EPC/DV-complex is a convenient and easy-to-use device, easily allows examining patients with various pathologies and, therefore, offers a wide range of applications.

2. The GDV method has shown itself to be very fast (i.e., it is an "express-method" for studying states of the human organism).

3. Our review has revealed that GDV method can be implemented as an express method for assessment of treatment procedure effectiveness, evaluating emotional and physical conditions of people, and in many other fields."

In 2000-2014 more than **200 papers** were published in per-review Russian and international journals and **130** papers in the Proceedings of different conferences.

What does the GDV method measure in physical terms?

The EPI method is based on the stimulation of photon and electron emissions from the surface of the object. The stimulation is provided by transmitting short electrical pulses. In other words, when the object is placed in an electromagnetic field, it is primarily electrons, and also to a certain degree photons, which are 'extracted' from the surface of the object. This process is called 'photo-electron emissions' and it has been thoroughly studied with

physical electronic methods. The emitted particles accelerate in the electromagnetic field, generating electronic avalanches on the surface of the dielectric (glass) plate. This process is called 'sliding gas discharge.' The discharge causes glow from the excitement of molecules in the surrounding gas, and this glow is what are being measured by the EPI method. Voltage pulses stimulate optoelectronic emission, while intensifying this emission in the gas discharge, amplified by the electric field created.

Can this emission take place without an electric field?

Yes, this emission can happen without an electric field, and such an emission is called 'spontaneous.' Measuring a spontaneous emission of electrons in the air is nearly impossible – it can only be done in a vacuum. Spontaneous emission of photons can be measured with the aid of a highly sensitive photomultiplier. This emission was measured for the first time by Professor **Alexander Gurvich** in the 1930s. He proved that the exchange of ultraviolet photons is the method used by biological systems to regulate information. Currently, the area called 'biophotonics' is researching extremely weak photon emissions from biological objects. Much of the research done has shown that photons are emitted by any biological object: plants [Kobayashi, 2003], blood and water [Voeikov, 2001], human skin [Cohen, Popp, 1998]. The quantity of photons emitted by the human head in a relaxed state and during meditation varies, and these variations are statistically reliable! [Van Wijk, et al, 2005]

> *Therefore, it has been categorically proven that all biological objects emit photons, and these photons participate in the processes of physiological regulation, and most importantly in oxidizing restorative chain reactions. In other words, all biological objects, including humans, are glowing both day and night!*

Biological life depends on using the energy of photons from the sun. This energy is converted into electron energy by photosynthesis in plants. Through a series of transformations in complex chains of albuminous molecules this light energy is converted into our body energy. Thus, biological life is based

on light energy, and organic compounds serve as the working material for the conversion of this energy. The basic ingredients for all conversions are water and air [Korotkov et al., 2004].

> *Consequently, we are all children of the Sun, living on the light of the world, and we ourselves emit light!*

Yet the registration of 'biophotons' – spontaneous photo-emission – is an extremely complex procedure requiring special conditions, the most important of which is total darkness. Until the measurement begins, people being tested spend an hour in a room illuminated with a dark red light, after which they are put in a totally dark chamber, where they will remain for a further 10 minutes in total darkness until the measurement starts. This elaborate process should eliminate any 'secondary luminescence' from the cutaneous covering following radiation by the sun or artificial light. The measurement process itself takes up to 45 minutes [Edwards et al., 1989]. So the process of measuring spontaneous photo-emission is very complex and long. Such measurements require a special and unique device, and can be accomplished only under specialized laboratory conditions.

The data obtained when measuring extremely weak 'biophotons' is invaluable scientific information, highlighting the role of electro-photon processes in the functioning of the body. These results are part of the scientific basis for the justification of the physical processes of EPI Bioelectrography.

> *In the EPI/GDV method, we excite or stimulate electron and photon emission, and then intensify the resulting glow a thousand times. This makes it possible to take measurements under normal circumstances, with normal lighting, without special preparation of the objects.*

All the information in the EPI method is obtained through computer processing of images and mass data. Without the methods of computer processing and specialized software, registering the glows of biological objects would be of no practical significance.

Therefore, EPI software is an integral part of the EPI system, and only by using EPI software is it possible to obtain complete information about the biological object carried by electrons and 'biophotons.'

What does the EPI method measure in biophysical terms?

So EPI measures the stimulated optoelectronic emission of a biological object. During the measurement process, an electric current flows through the circuitry of the EPI device. Controlled by the design and construction of the device, the current is a pulsed current and is very small – micro amps. This is why the current causes no substantive physiological effects and is totally safe for the human body. But what kind of current is this in biophysical terms?

An electric current can be dependent on the conveyance of electrons or ions. When voltage pulses lasting longer than a few milliseconds are transmitted to the cutaneous covering, tissue depolarization takes place and ions are conveyed. For many electro-physical measurement methods, such as electroencephalography or electro-acupuncture, tissue polarization due to overlapping of electrodes poses a major problem and is resolved by using special pastes or gels. The EPI method uses very short pulses, so depolarization does not occur and ionic currents are not stimulated.

Where does the electronic current in the body come from?

Let us look at the time curve of the EPI signal of the skin (fig.1). A typical curve initially falls, and shortly after the beginning of the measurement it stays at a relatively stable level, with occasional fluctuations.

There are two phases in this process. The initial stage is the extraction of electrons located in the outer layers of the cutaneous covering and the surrounding tissue. The number of these electrons is limited, which is why the current constantly decreases. In the second phase, electrons from the deepest tissues in the body are included in the current flow. These electrons have several sources.

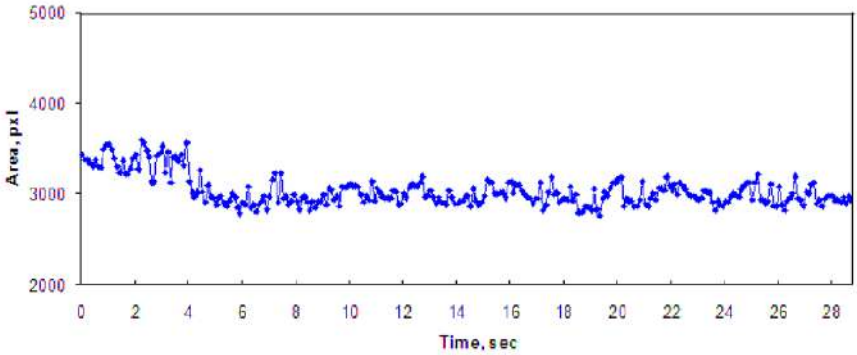


Fig.1. Time dependence of EPC signal from human finger.

Some of these belong to molecular albuminous systems, and in accordance with the laws of quantum mechanics, these electrons are dispersed among all the molecules. It is as if they are 'collectivized' between groups of molecules, so in principle it is impossible to say where an electron is at a given time. They form a so called 'electron cloud,' occupying a specific area in space. We can see similar clouds in the blue July sky, and when a drop of rain falls on you, you can never tell from which part of the cloud the drop fell.

> *So the electron current in biological tissues is a transfer of electron-stimulated states along chains of albuminous molecules*
>
> Rubin, 1999

Other sources of electrons in EPI processes are free radicals which form in the blood and tissues. There is a widely-held view that free radicals are the worst enemy of health, and that they should be fought in every way possible. Yet the body converts 70% of inhaled oxygen into free radicals, to be able to use them straight away. Why is this process necessary? Over millions of years of evolution, could nature not have managed to change a mechanism harmful to health? Clearly, since the process of formation of free radicals was retained, it is necessary for biological functioning. Indeed, as has been demonstrated recently, free radicals are one of the sources of electrons and during free radical reactions; energy is transferred and converted [Voeikov et al., 2003]. Consequently, blood is one of the main substrata of the electron current.

If we look again at fig.1, we can see that, in the second phase, with the establishment of a quasi-stable current, mechanisms for the transfer of electrons are engaged along the albuminous molecules mainly in the connective tissue, and along the circulatory system. In other words, the 'electron storehouse' of the body is engaged.

When the body is functioning normally, electron clouds are distributed among all systems and organs. Active transfer of oxygen to the blood takes place and all tissue consumes oxygen, using it in a cascade of biochemical conversions. Among the main consumers of these processes are the mitochondria, which use electrons to convert ATP energy molecules. In this case, the active transfer of electrons to the tissue is ensured, as is the free radical mechanism of transferring electrons to the blood, which is evident in the quasi-stable current during EPI stimulation.

In cases of imbalances and dysfunctions, immunodeficiency, or an abnormality of the micro capillary blood circulation, the transfer of electrons to the tissue is hindered. Free radical reactions do not flow in full volume, the 'electron storehouse' of the body is not full, and the stimulated current is either very small or is very irregular in time. Fig.2 shows a dynamic curve for a patient with such abnormalities. As is clear when comparing Figures 1 and 2, the patient's dynamic curve has much higher variability.

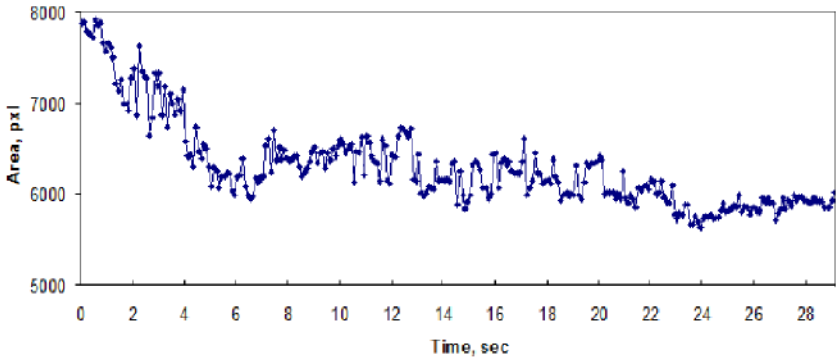


Fig.2. Time dependence of EPC signal from human finger.

Therefore, the lack of glow on the EPI-gram is an indicator of the impeded transfer of electron density to the body's tissues, and an abnormality in the flow of free radical reactions. This is an indicator of an abnormality in the energy supply of organs and systems.

It now makes sense to come to grips with the concept of energy itself, and how this concept is linked to the body's state.

What is energy?

Energy (from the Greek enérgeia – action, activity), is a general quantitative measure of any type of movement, activity and the interaction of all types of matter. Energy in nature does not come from nothing and does not disappear; it can only be transferred from one form to another. The concept of energy binds together all natural phenomena.

Just as there are different forms of the movement of matter, there are different forms of energy: kinetic and potential, mechanic, electromagnetic, nuclear and so on. These divisions are generally well-known. So chemical energy is made up of the kinetic energy of the movement of electrons and the electrical energy of the interaction of electrons amongst themselves and with atomic nuclei. Internal energy is equal to the sum of the kinetic energy of molecular movement around the centre of body mass and the potential energies of the interaction of molecules amongst themselves.

The theory of relativity shows that the energy E of the body is inextricably linked to its mass m as in the equation $E = mc^2$, where c is the velocity of light in a vacuum. This means that in any amount of mass we have huge energy potential. The best prove is an atomic or nuclear bomb where from little mass we directly extract energy.

Any body possesses energy, and this energy can change from one type to another. Human body has tremendous resourse of energy, which may be used for physical, emotional or mental activity. We accept this energy from food, water and light. These are the main resourses of life.

According to classical physics, the energy of any system is constantly changing and can assume any value. According to the quantum theory, the energy of micro particles, whose movement occurs in a limited area in space (for example, electrons in atoms), adopts a discrete series of values. Atoms radiate electromagnetic energy in the form of discrete portions – light quanta, or photons.

From a biophysical standpoint, the energy of systems and organs is determined by the level of mitochondria ensured by free electrons, i.e. by the character of electron transport. The capacity of mitochondra to produce ATP determines the possibility of accomplishing the work for the processes of

physiological activity. But the possibility of accomplishing work is also called energy.

The EPI method measures electron densities in human systems and organs, as well as the character of the stimulated electron currents. These electron densities are the fundamental basis of the physiological energy, so we can say with confidence that the **EPI method makes it possible to measure the body's potential energy reserve.**

What is biological energy?

The main reservoir of free energy in biological processes is electron-excited states of complex molecular systems. Communities of delocalized excited π-electrons in protein macromolecules are the basis of this energy reservoir. Specific structural-protein complexes within the mass of the skin provide channels of heightened electron conductivity, measured at acupuncture points on the surface. These excited states are continuously supported at the expense of electron circulation in the biosphere. The main "working substance" is water and the energy source is the sun. A part of these electron excited states is expended for the support of current energy resources in the organism. A part can also be reserved for the future, as it happens in lasers after the absorption of the pump pulse.

The flow of impulse electrical current in non-conducting biological tissues might be provided by intermolecular transfer of excited electrons, using the mechanism of quantum tunnel effects, with the activated jump of electrons between macromolecules in the contact area. Thus, it can be assumed that the formation of specific structural-protein complexes within the mass of epidermis and dermis of the skin provides channels of heightened electron conductivity, which are experimentally measured as electrical conductance at acupuncture points on the surface of epidermis. Such channels can be theoretically present within the mass of connective tissue, which can be associated with "energy" meridians. ***In other words, the notion of "energy" transfer, characteristic of the ideas of Eastern medicine and alien to most people with a European education, might be associated with the transport of electron-excited states through molecular protein complexes.*** When physical or mental work is done in certain systems of the organism, electrons distributed in protein structures are transported within their given place and

provide the process of oxidative phosphorylation, i.e. the energy supply for functioning of a local system. Thus, the organism forms an electron "energy depot," supporting the current functioning and being the basis for work, at some moments requiring great resources or rapid flowing under conditions of extra-high loads -- typical, for example, of professional sport.

Stimulated impulse emission is also developed mainly by the transport of delocalized π-electrons, realized in electrically non-conducting tissue by way of the quantum electron tunnel mechanism. This proposition allows an assumption that the EPI technique provides indirect judgment about the level of energy resources at the molecular level of functioning in structural-protein complexes. (see Korotkov K., Williams B., Wisneski L. Biophysical Energy Transfer Mechanisms in Living Systems: The Basis of Life Processes. J of Alternative and Complementary Medicine, 2004, 10, 1, 49-57).

What does the GDV/EPI method measure in physiological terms?

The working of all the organs and systems is regulated by the central nervous system (CNS) and the autonomic nervous system (ANS).

It is possible to draw an analogy between the working of the body and the playing of a symphony orchestra. The finest movements of dozens of people in the orchestra are in total harmony, they are following the same part and respond sensitively to the tiniest direction from the conductor. You could single out the viola or oboe part, and they would sound like part of one beautiful melody.

It is the same in the body: each organ and each system plays its role, but they are all following one rhythm, one autonomous control.

But then one of the violins loses the rhythm, falling out of time with the overall control system. This goes unnoticed by the untrained ear, and only an experienced listener will hear the wrong note. The melody will sound, but the greater the number of instruments which fall out of line with the control system, the stronger and more noticeable the dissonance will be, until finally even the most uneducated listener will start to wince and slowly creep out of the concert hall.

This analogy can be applied to the working of the body. As long as all systems and organs are working in harmony, in unison, following the same program, the body is at its optimal functioning level. Control and direction are ensured by two fundamental mechanisms:

- autonomic control by the nervous system (ANS), including neurohumoral regulation of activity;
- electron control through active forms of oxygen in the blood.

It could be said that this control is the base level, making it possible to detect all external impacts and react to them instantly, supporting Homeostasis and the relative constancy of the body's internal environment.

If a person runs about and makes a few sudden movements, and the ANS increases the frequency of the heart's contractions, then breathing speeds up, increasing respiration. More oxygen gets into the blood, and this oxygen is more actively conveyed to the tissues, with some of the by-products of the increase in respiration coming out in perspiration through the skin.

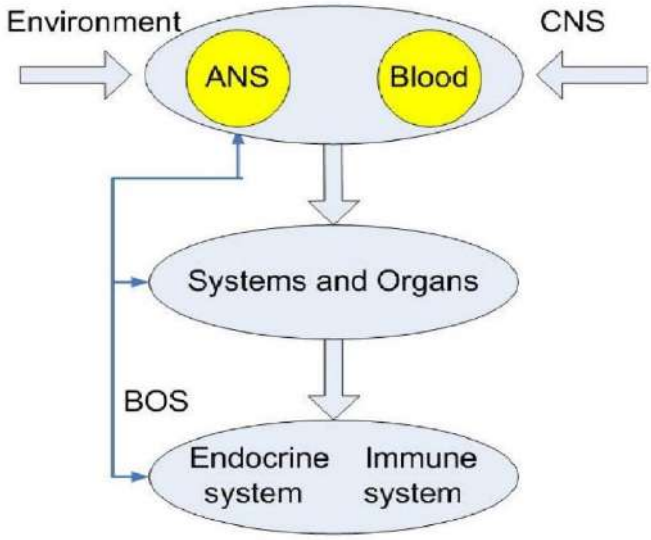
The reaction takes places almost instantaneously, and the whole body, all its systems and organs, are engaged by this reaction. This is evidence that all the organs and systems are working in a synchronised way under the control of a single commanding system. Everything happens as in a well-tuned orchestra.

When autonomic regulation fails and that synchronization is lost, the organs and systems stop working in harmony and functional abnormalities appear. In the first phases, these abnormalities appear as a bad state of health, disturbed sleep and digestion, and abnormalities with perspiration and so on. Continued dysfunction leads to abnormalities at the level of the organs, although the area of abnormality depends on the type of load and genetic predisposition.

Reacting to commands coming from the CNS and the surrounding environment, the ANS and blood send information control signals to the body's systems and organs. These signals are 'processed' both at the physiological level of systems and by engaging the endocrine and immune systems. Information is transferred to the controlling organs, forming a Biological Reverse System (BRS). In this way, a closed circuit of control is formed. When there is an abnormality in any one of the information links,

the circuit fails and de-synchronization occurs, reflected in the functional abnormalities at all of the most vital levels.

Therefore, the autonomic nervous system enters into the first circuit of control, and the early signs of potential problems appear mainly at the level of ANS activity.



This rather simplified diagram of fig.1.3 shows the general character of the body's reactions and the development of diseases.

There is much experimental data which proves that the EPI method measures the activity of the autonomic nervous system. This is demonstrated by statistically significant correlations with the results of the measurements of the variability of cardiac rhythm [Cioca et al., 2004], of systolic and diasystolic pressure [Alexandrova et al, 2004], perspiration through the skin [Rizzo-Roberts, 2004], and the stress level [Bundzen et al, 2002]. The findings about the link between EPI data and ANS activity were first made in research on adaptation and homeostasis during work [Drozdov, Schatsillo, 2005] and subsequent results confirmed these findings.

> *There is clearly justification for affirming that the parameters of EPI images reflect the activity of the autonomic nervous system and the balance of sympathetic and parasympathetic sections of this system.*

What is the sensitivity of the GDV/EPI method based on?

The autonomous nervous system is the main indicator of the body's reaction to external and internal impacts – ranging from changes in the weather, chemicals in food and the efficiency of oxygen absorption to emotional worries. All of these processes are managed by the sympathetic and parasympathetic nervous system and are reflected in the parameters of the skin. The electrical resistance of the skin changes, both as a whole and at electro-puncture points, the capillaries can narrow and widen, organic molecules are emitted through the skin pores, and the character of electron transfer in the connective tissues also changes. All of these processes influence the emission of electrons from the skin and the development of electron avalanches, which are reflected in the parameters of the EPI-gram.

Many years of research into the physics and biophysics of the visualization processes have made it possible to discern optimal conditions for the development of all processes, which now make it possible to obtain sensitive and well-reproduced EPI images.

The influence of mental, emotional and spiritual processes on BIO-grams

An interesting aspect of EPI applications is the research into consciousness processes. Many years of experimentation have made it possible to identify bioelectrographic correlates of **altered states of consciousness (ASC)** [Bundzen et al, 2000; 2002]. These are particular states, which a person enters during meditation, mental training, religious ecstasy, or when under the influence of drugs, psychedelics or anesthesia. For many years we have been measuring Russian extrasensories, Candamblier priests in Brazil, participants of the Ayahuasca ceremony in Peru [Korotkov, 2002, 2003], Chinese Qi-gong masters, and healers in Germany, the USA, and Slovenia [Measuring Energy Fields, 2004]. And almost all of these observations we obtain signs characteristic of ASC. Similar results, using the most diverse devices and methods, were obtained in the laboratories of different countries [Radin,

1997; Milton, 1996]. This shows that the processes of consciousness are apparent on the physiological processes measured by the EPI method.

We do not intend in this book to discuss the philosophical aspects of the process of researching consciousness. That could be the theme of an entirely separate, specialized book. Let us look simply at the opinions on which our work is based. We support the idea that consciousness is a category of a different space-time continuum which does not belong to the material world. These principles of working on consciousness are to a large extent modeled on the quantum mechanics paradigm, but clearly this is only a superficial analogy. We are still a long way from understanding the working mechanisms of consciousness, taking into account not only its individual manifestation in each person, but also its collective processes [Korotkov, 2001]. Human consciousness is a process of interaction between a person and a collective field, through which new ideas are formed, and the field is the place to which they return, making a contribution to the collective mind of humanity.

With physical devices we measure physical processes, i.e. processes of the material world. This is connected to biology as much as to physics and chemistry. That is why we can only measure the **influence of consciousness on physiological or physical processes.** This influence is conveyed along several channels, primarily through the cerebrum, which takes an active part in thought and emotion processes. The brain produces a cascade of chemical substances which influence physiological processes, and also the central nervous system models the work of the autonomic nervous system [Wisneski, Anderson, 2009].

We have already left behind the idea that the brain produces consciousness like the liver produces bile. The brain is better presented as a receptacle which reacts to the signals of the surrounding space, including signals from the collective field. Hairs can act as the antenna of these signals, as they react to the external field and transmit these signals to the cutaneous covering, possibly with some intensification. The numerous results of our experiments testify to this process with human hair [Vainshelboim et al, 2005].

The heart is another organ which takes part in the processes of consciousness. This is not merely a pump for blood, but an organ which regulates the blood flow and, accordingly, oxygen, in all areas of the human body. There is data showing that after a heart transplant, a person takes on many behavioural

characteristics of the donor. So we can conclude that the heart, at least, has a memory, i.e. it takes part in consciousness processes.

The experimental observations measure the influence of consciousness on physiological processes. In this regard, the EPI method is very sensitive, because it reacts to subtle changes in the working of the ANS. These sensitive measures make it possible to register subconscious and emotional processes.

Another method is the registration of the influence of human consciousness on physical sensors. One of the most recent is water, or specially constructed systems. Many experiments have proved that such an approach is highly effective [Science of Whole Person Healing, 2004].

Modern science has only just begun to research consciousness. Following the remarkable insights of Fechner, Helmholtz, Jung and Freud, a significant process was set in motion to study the brain's neuron mechanisms, especially using modern methods of computer mapping. Yet we are still only in the early stages of the process of researching consciousness, and the most important thing at the moment is the set of experimental data. Their meta-analysis at a specific stage will provide an awareness of new concepts and lead us toward a new understanding.

Part II

Practical Basis of Electrophotonic GDV Analysis

If it were now to die,
Twere now to be more happy; I fear
My soul hath her content so absolute
That not another comfort like to this
Succeeds.
William Shakespere, Othello II, 1

The basic principles of GDV/EPI analysis of the person's energy condition are as follows:

- Information must be taken from the 10 fingers with and without filter.
- The fingers must not be washed before the EPI images are taken. If there is dirt, moisture or sweat, wipe with a soft cloth. In the case of heavy perspiration, wipe every finger just before the EPI images are taken.
- Any strong drug, medications (in particulary hormones and anti-depressants), alcohol change the energy of the body. Ask patient before measuring.
- Different EPI programs provide different information about the energy because they use different principles for processing the information, therefore a full analysis requires processing in all programs. It allows for several types of analysis:
- The image of the energy field provides a general image of the distribution of energy, it does not allow for a detailed analysis, although it shows basic regions requiring attention. The program *Energy Field* is very convenient for monitoring the condition during successive measurements of the same person.

- The health status and energy status diagrams are very convenient, practical and reliable method for analyzing the person's conditions.
  - Assessing the stress level, energy level and left-right balance, both of the energy field as a whole, and of different organs and systems of the body.
  - Identifying the zones requiring attention (without and with filter, both right and left hands).
  - Compare the conditions when taking EPI images in different moments; after carrying out a procedure, exercise, or intervention and so forth.
  - Accomplish a detailed analysis of the energy condition of the organs and systems by assessing the various sectors of individual fingers.

The sector analysis of fingers is the most detailed one, it reveals the particulars of the condition of a given system or organ. Other programs give additional information.

The sector analysis of individual fingers is the final phase of EPI analysis of the person's condition.

IMPORTANT NOTE

The EPI analysis is not currently certified as a method of medical diagnosis of specific disease. It is intended to provide guidelines to qualified healthcare professionals with full knowledge of patient history and concerns to assist in their design of an appropriate healthcare program. EPI makes it possible to analyze the energy state of a person and his/her autonomic status, i.e. to assess the condition of the body from the point of view of the functioning of the autonomic nervous system.

Using the data from this analysis, as well as other instrumental measurements (such as ECG, blood analysis, ultrasound, visual checkup, genetic data, etc.) the doctor or competent specialist can make a diagnosis as well as prescribe a treatment.

The analyses considered above were based on the use of the Diagnostic Map, which shows the correlation between the separate sectors of the fingers and the energy state of the organs and the system (fig. 1.4). That map was first

proposed by Dr. Peter Mandel in Germany [Mandel, 1989], based on the ideas of traditional Chinese medicine about energy meridians. In the 1990s this map was modified with reference to the EPI device and all sectors were tested in medical institutions in Russia on the basis of major clinical material.

> *All sectors used in the Diagnosis Map have been verified through significant clinical trials.*

Mandel's and Korotkov's maps differ significantly.

EPI images with and without filter

The EPI filter is a specially made polyethylene film that is placed on the glass electrode plate of the EPI camera at the time of taking EPI images. Its role can be explained by means of a simple example.

Let us suppose that we put on a thin surgical glove and take EPI images of the fingers. They will give a similar bright glow. The glove phyically isolates the surface of the cutaneous covering – with its perspiration and secreted skin gases. With the skin surface processes separated from the glass electrode plate, the images will only reflect the particularities linked to the conditions of the body as a single system. In other words, we remove a significant part of the influence exerted by the autonomic nervous system.

The EPI polyethylene filter plays the same role as the surgical glove. It eliminates the direct influence of the cutaneous covering on the EPI images.

With the polyethelene filter in place, electrons penetrate inside this film and multiply there giving an impression of a more smooth and continuous image. These way only areas with strong defects will be presented in the image. So we can tell that the film filters out details related mostly to psychosomatic activity. In most cases EPI images with filter (F) are stronger than EPI images without filter (wF).

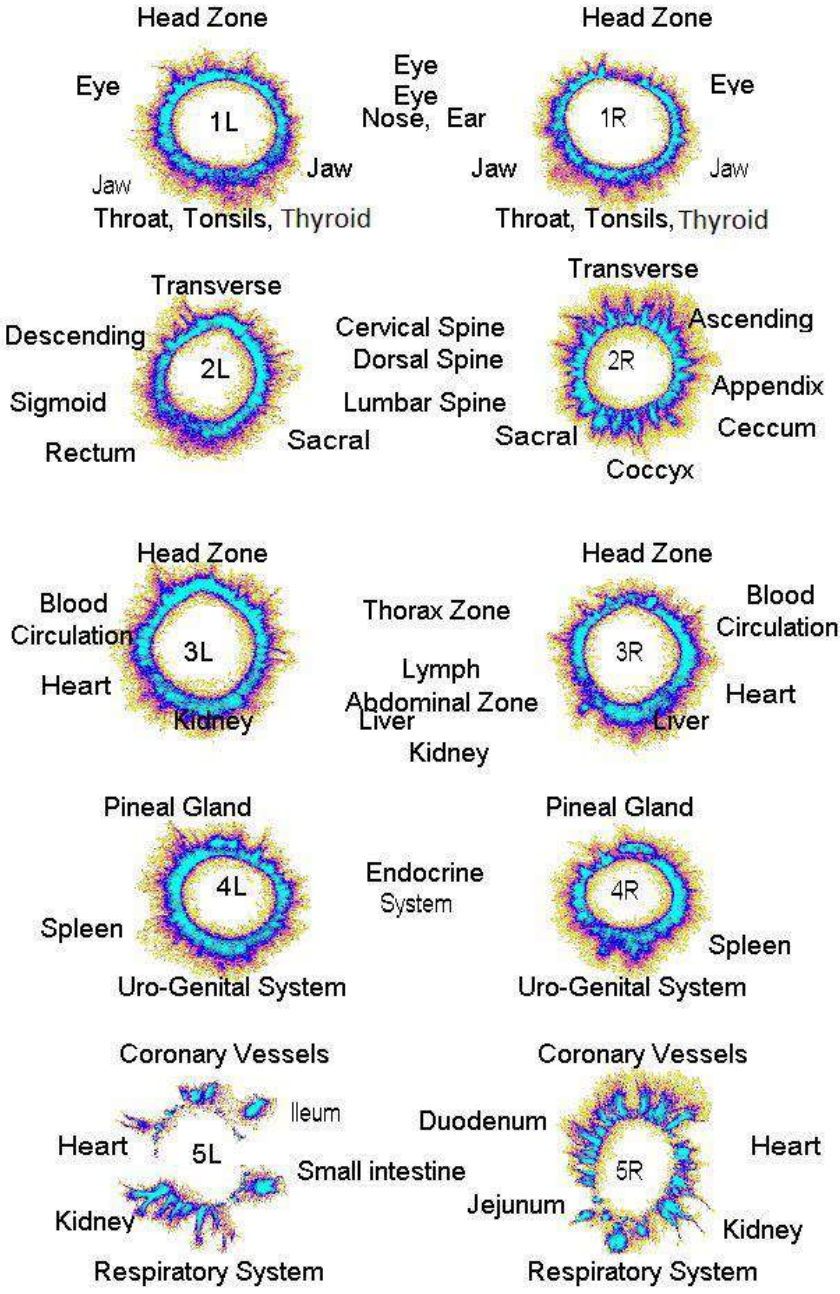


Fig. Diagnostic Map after Korotkov

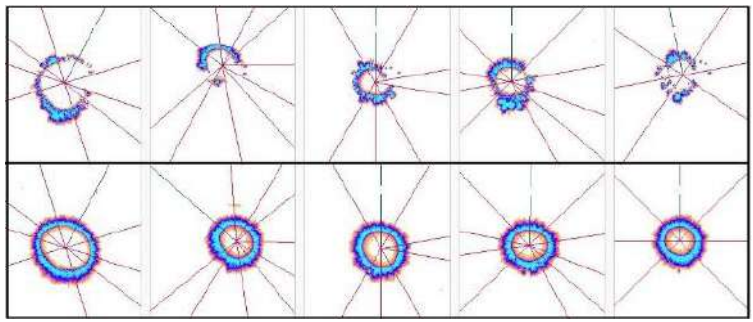


Fig. GDV/EPC images of the right hand without filter and with filter.

Clinical research demonstrated that when we compare the pictures taken with and without filter we get information about the balance of the sympathetic/parasympathetic parts of the autonomic nervous system. When we analyze the person's psycho-physiological conditions it is essential to take the EPI images with and without filter.

EPI images without filter carry information about the current conditions of the energy organs and systems in a given moment in time. They reflect the particularities of the autonomic status, that is, effects of both physiological and psychological processes. Repeatability and reiteration of the EPI images without filter is determined by the stability and lability of the nervous-psychic processes, that is, by the type of the person's constitution. From this relationship with psychic lability, the characterization of EPI images without filter [Korotkov, 2001] correlates well with the characterization of psychological types both according to Western principles, and Oriental systems, such as Ayurveda.

We can say that the EPI images without filter reflect the person's current psychological-physiological condition, his nervous-psychic state and EPI images with filter reflect the body's base somatic level of energy.

EPI images with filter carry information about autonomic control at the level of stable physiological processes. In other words, EPI images with filter reflect the level of physiological energy that ensures the functioning of the body at a base and organic energy level. This level is very stable, it ensures long term body functioning and remains present throughout psycho-physiological

changes. This energy reserve is constantly replenished through the basic energy metabolism, with the participation of electronic processes in the tissues and the blood's oxygen. When the organ function is normal, the EPI images with filter are very stable and reproducible, and their changes are evidence of pathological processes at a deep energy level, generally linked to organic processes. EPI images with filter reflect the physical condition of organs and systems.

> *The stronger the autonomic deregulation or imbalance is, the stronger will be the divergences between images with and without filter.*

The evaluation of this divergence can easily be carried out with the program *GDV Diagram* (fig.2.3). The program reflects the standardized logarithmic values of the EPI images area, divided into sectors in accordance with the EPI diagnostic table. According to the contrast between EPI -diagrams with and without filter, we can calculate the activation coefficient which is an evaluation of the stress level of a given person. This is the approach we established in 2000; it was tested on a significant number of people alongside various psychological tests. For example, in the case presented at fig.2.3 the level of stress A = 9.65, which is very high on a 0....10 scale. We found high coefficients of statistical correlation between values of the EPI activation coefficient and levels of anxiety, physiological activation and stress, all being determined by different tests [Kondratiev et al., 2003]. Thus the significance of the EPI approach for identifying the level of psycho-physiological stress was proved in numerous independent psycho-physiological experiments.

The scale of the ***Stess or Activation coefficient*** can be easily interpreted:

Activation coefficient in range 0-2: absolutely calm and totally relaxed person, it could be for several reasons: deep meditation, complete inner peace; the effects of psychedelics; deep sleep in the peaceful phase; at the same time it may be the case of chronic depression or severe disees; we'll discuss this in the next part of the book.

Activation coefficient in range 2-4: normal, calm condition.

Activation coefficient in range 4-6: excited state, characteristic of active work, emotional excitement and tense activity. This state is typical in high level managers, militaries and people with responsible jobs. It may be related as

well to the high anxiety level. The state of permanent anxiety without relaxations may be the reason for serious problems.

Activation coefficient in range 6-7: there are at least four possible situations:

- Reaction to a previous stressful situation (unpleasant conversation, illness, car driving under stressful conditions, etc.). In this case it is absolutely necessary to calm the patient and repeat the measurement after half an hour.
- Heightened nervousness, accumulated during long term stress, emotional tension and autonomic disorder.
- People with special type of psyche, capable of switching rapidly from high excitement and nervousness to a calm state.
- Athletes in the moment of competition, actors at the performance, students at exams, etc.
- Children in a state of nervous excitement.

Activation coefficient in range 7-10: very high stress level, peak of emotional excitement.

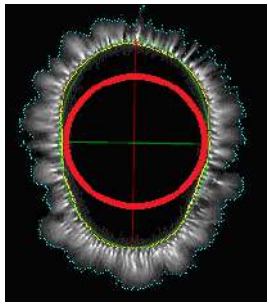
> *Pay close attention to perspiration on the hands: wipe every finger with a tissue and repeat the EPI images taken for each finger separately. In any case, perspiration on the hands is a sign of autonomic imbalance.*

If a patient with activation level 8-10 appears calm, this could indicate a dangerous situation: the person is on the verge of a nervous breakdown, so be aware and exercise caution.

Note that the EPI method makes it possible to measure the level of physiological stress, that is, the activation level of the autonomic nervous system, which does not always coincide with the level of psychological stress, or **level of acknowledged psychological tension**. For example, a person who suffers an intense psychological trauma – loss of a close person, a difficult divorce, traffic accident, etc. – may have quite a calm appearance and react adequately to external stimulus, but the level of physiological stress will be very high.

Parameters of EPI-grams used for the analysis

The common image processing application packages can not be used for processing EPI-grams, because the tasks are specific. Diagnostic hypotheses must be taken into account, and processing should be done on the level of decision-making systems. Therefore, a software environment was developed for processing and analyzing EPI-grams, oriented towards the work in different problem domains. Adaptation for particular assessment is performed through a combination of optimal operations from the library for the given problem domain, selection of corresponding procedures, and (or) selection of optimal threshold values.



Area

Amount of light quanta generated by the subject in computer units - pixels. (the number of pixels in the image having brightness above the threshold).

- Level of adaptation of organism to inner (psycho-physiological) and external (stress, food, ecology) influences;
- Character of metabolism;
- Adequacy of functional reserves; vital resources.
- Depends on quantity of electrons in avalanches, ionizing air gap;
- The more electrons, the higher level of metabolic rate;
- Area of glow is in proportion to quantity of electrons.

Intensity

Level of quantum activity of a subject. The spectrum of Intensity is presented in computer units.

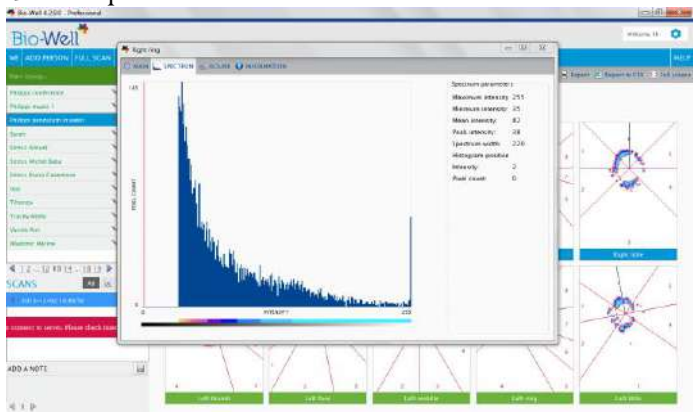


Fig. The spectrum of BIO-gram.

Energy

Energy of light in Joules. Calculated both for the whole image and for every sector of a finger as follows: E(corr) = E x 360/a, where E is energy of a sector, a – width of this sector in degrees.

Normalized area

the ratio of BIO-gram area to the area of the inner oval

Entropy coefficient

the ratio of BIO-gram external contour to the internal contour

- Measure of chaos in regulation of biological and physiological functions;
- Level of deregulation;
- Level and velocity of wear processes in organism (velocity of aging);
- Level of tolerance to external influences.

Form Coefficient

is calculated according to the formula: FC = aL^2/S, where L is the length of the BIO-gram external contour and S is the BIO-gram area, characteristic of the complexity of contour of the image.

- multicircuit control of physiology regulation;
- The higher FC, the more regulation systems are involved in the process.

Inner noise

Amount of light in the inner contour of the Bio-gram – characteristic of the organism activity.

Stress coefficient

- Level of organism involvement in state of stress-adaptation;
- "Level of stress";
- Balance of activity of sympathetic and parasympathetic nervous systems work.

The next set of calculations is based on transformation of the initial image from the spherical coordinate frame into the Descartes system of one-dimentional curves with Euler equations, according to the brightness and vector equidensities (fig.2.5). The image can be represented as a function F(x) of some argument x of the angle within the limits [0-360o]. Maximal length of the image radius, median's length, brightness or average values along the radius can serve as the function F(x). As a rule, the function F(x) is heterogeneous and changes quite chaotically. It can be interpreted as a part of an unlimited probabilistic variable and mathematical principles can be applied

for describing statistical dependencies, enabling the calculation of a number of parameters.

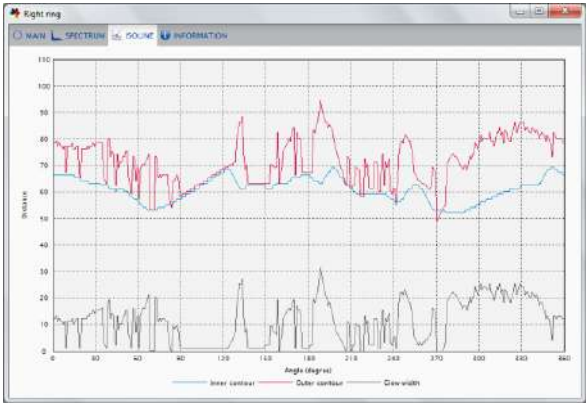


Fig. Linear presentation of a BIO-gram

Length of image outer countour length of envelope of the image contour.

Emission coefficient (EC) characterizes the power of small fragments deleted from the BIO-gram and is measured in pixels.

Fractality coefficient (FrC) is calculated according to the algorithm of Mandelbrot as a ratio of lengths of perimeters of the image glow, obtained in different scales of BIO-gram. Form and fractality coefficients show the degree of irregularity of the BIO-gram external contour.

Integral area coefficient JS is a characteristic calculated in BIO Diagram program according to the formula:

$$JS = \ln \frac{S}{S_1} / \ln \frac{S'}{S_1'}$$

where S – BIO-gram background area, S_1 – inner contour area, S' – area of ideal image, S_1' – area of the inner contour of an ideal image.

For evaluation of the functional state of particular functional systems and organs, these parameters may be calculated for the whole BIO-gram or for the sectors of particular projection zones.

The following main algorithms are included in the library:

Pseudo-coloring. For visual estimation of the image, there are several algorithms of pseudo-coloring, oriented towards marking out several peculiarities of EPI-grams. The following types of pseudo-coloring are provided in the programs (fig.1.7):

1. **Original image** – image as it was obtained from the video camera and saved in an AVI-file. A gray color palette containing 256 shades of gray (from black to white) is used.

2. **Inverted image** – inverted gray color palette is used, containing 256 shades of gray (from black to white). Particular small details and thin streamers are better seen in this palette than in the initial image.

3. **Intensity palette** – image points are colored in one of eight colors. The brightest glow points are colored in the shades of blue, less bright points are colored in the shades of red. Points are colored in yellow when the intensity is higher than the noise level, but lower than the base noise level for the given frame. All image points removed by noise filtration are shown as white background.

4. **Solid palette** – all image points removed by noise filtration are shown in black color, the rest of the points are shown in a monotonous bright color. Use this palette for analyzing a sector's glow area and glow area of the whole image, in order to avoid optical illusion, which can occur if some points are not seen well, as the coloring is similar to the coloring of "noise" points.

5. **Blue palette** – color palette containing 256 shades of blue (from black to bright blue) is used. Points with minimal intensity of glow are shown in dark (almost black) shades, points with maximal intensity of glow are shown in bright (almost blue) shades. This palette displays the glow similar to the way it can be seen in the instrument's electrode by the naked eye.

6. **Energy palette** – the image points are colored in one of the nine colors. The brightest glow points are colored in blues, the less bright ones are colored in reds, oranges and violets. All image points removed by the noise filtering algorithm are displayed as white background.

Specially designed programs allow for easy calculation of EPI-gram parameters. The main indices used are as follows: total **area, normalized area, length of image perimeter, average intensity, emission coefficient, form coefficient, fractality coefficient, entropy, and integral area coefficient;** along with dispersions of all these listed parameters.

For evaluation of the functional state of particular functional systems and organs, these parameters may be calculated for the whole EPI-gram or for the sectors of particular projection zones. All parameters may be saved in Bio-Well programs as an CSV file for further processing in statistical programs.

Scientific principle of Energy evaluation

Sensitivity of a CCD camera in [http://ellphi.lebedev.ru/20/pdf18.pdf]] was evaluated as follows:

$$\frac{1}{S} = \frac{W}{I} = \frac{E}{s \times I} = \frac{4P \times t \times T}{\pi \times d^2 \times I},$$

where W – relative energy of a light source [J/cm2]; I – amplitude of a signal; E –energy of a light source [J]; s – illuminated area of a CCD element [cm2]; P – power of a light source [Wt]; t – exposure time [sec]; T – filter coefficient ; d – diameter of illuminated area of a CCD element [cm]; $s = \pi d$; $W = E/s = P \times t \times T / s$.

For λ = 424 nm sensitivity of CCD element was experimentally evaluated as 4*10-10 J/cm2 and it was increasing with decreasing of wavelength. It is clear that this parameter depends on the type of CCD and optical system being used. So we have made an experimental evaluation of the GDV instrument using standard lamp with tungsten filament having power P = 10 W with relatively uniform field of illumination. For this lamp the area of illumination in GDV programs was S = 61000 pxl with intensity specter (J) from 55 to 255 with max at 160 and average 220.

From this the equivalent power of the light source may be evaluated as follows:

P (W) = S*I**10 /61000*200= S*I*8*10-9

GDV image of a healthy person may have parameters S = 10000 pxl, Iaver = 80 => P = 640 mW. GDV image of a un-healthy person may have parameters S = 4000 pxl, Iaver = 60 => P = 19 mW. Energy E (J) = P (W) * t (s)

GDV impulses with t = 10-4 s follow with frequency 1000 Hz for 0.5 s. So the time of signal accumulation at the CCD element is equal to s, from this E = 5*10-2 P. Equation for the Energy of Illumination in GDV case may be presented as follows: E (J) = S*I*4*10-8

Using this equation, we may present both results of GDV-grams processing and the dynamic data in the units of the Energy of Illumination.

GDV/EPI Software Design

The GDV software complex consists of the following main blocks:

a) The library of operations, where the main functions for processing and analysis of BIO-grams are realized in the form of completed software modules: preprocessing of images (software discretization; deletion of noise; pseudo-coloring); segmentation of BIO-grams (creation of an inscribed ellipse; image sector division); image scanning; calculation of various parameters of an image; classification of BIO-grams;

b) The subsystem for synthesis of procedures, where a general procedure for processing and analysis of BIO-grams is projected in an automated mode, on the basis of results from previous training by test problems. In the process of synthesis of a procedure, an interactive mode is provided, aimed at taking into account specific requirements of image analysis;

c) The graphical user interface represents a complex of programs, providing interaction of the user with the software-hardware complex;

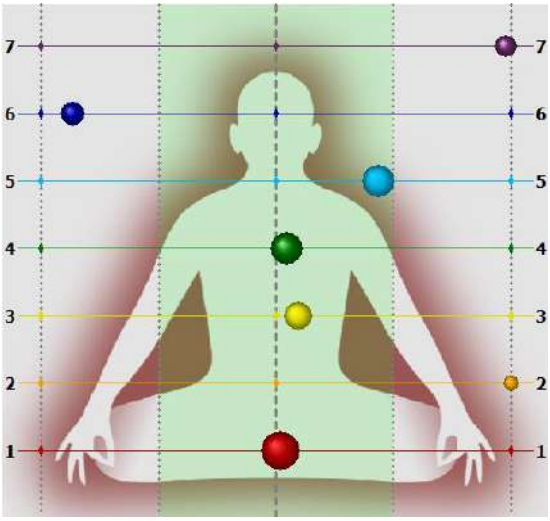
d) The system procedures are developed on the basis of the library of operations (a): observation of the EPI signal in real-time scale; initial loading and saving of images with inner data compression; statistical processing of the parameters obtained and creation of histograms; synthesis and printing of conclusions in the required form.

All the above-mentioned procedures are united in the EPI software complex working in the Microsoft Windows and Apple environment. Every program has a Manual with detailed description of operations, so we will give only a brief overview here.

The **GDV Energy Field** program is designed to process GDV images and to build a model of the human energy field using the information obtained from 10 GDV images of human fingers. The creation of the energy field is based on a diagnostic map. The **GDV Energy Field** shows the human energy field as an image around the human contour and represents it in tables and diagrams in numeric form.

The **GDV Virtual Chakra** program is designed for graphical display of the GDV-parameter distribution among energy centers of the human body –

chakras – based on processing of GDV-images of ten fingers. The calculation of the energy of GDV-chakras is based on the ideas of Ayurvedic medicine. For each chakra the program produces the value, asymmetry and interpretation of chakra energy in compliance with the Ayurvedic concepts. In Chakras evaluation, both position and size are significant. Chakras analysis usually is more related to psychological and spiritual condition of a person then to physical. For example, for the image below we may tell that this person is very well grounded (Chakra N1 is strong and centered), have an active emotional life (heart Chaka N4 is strong), but her spiritual development is very chaotic (upper Chakras N 6 and 7 are small and out of order). Some problems with reproductive system (Chakra N2). Together with Energy Field analysis this type of analysis may give you good evaluation of a person' condition.



Pressing **Create music** button allows generating specific for the particular Biogram music file. It may be saved in the computer and played using both from the computer and any music player. Used for the Energy correction together with the special **BioCorr** device.

In Ayurvedic texts you may find description of different properties associated with Chakras. Some materials are presented in the Report, generated by the Bio-Well program.

Health Status

The **Health Status** window is designed for analysis of the functional state of the human body, by calculating the integral parameters of energy distribution in the body and in organs and for their comparison with reference parameters of a practically healthy person formed according to the database.
The obtained data is displayed in a graphic form as circle diagrams.

The typical energy level corresponds to the green ring in the middle. The inner circle is the area of **energy deficiency (hypo-energy state)**. The outer ring is the area of **energy excess (hyper-energy state)**. The diagrams are divided into the sectors related to a certain part of the human body. When you move the mouse cursor over the graph the program will highlight the current sector. Click the left mouse and the screen corresponding to the particular finger will appear.

IMPORTANT!

> *To have the correct processing in the* **Health Status program**, *images should have the appropriate calibration, i.e. the camera should be calibrated in an appropriate way. Without calibration interpretation of diagrams S may be incorrect.*

Energy Status

The **Energy Status** program is designed for analysis of the functional state of the human body, by calculating the **Energy** parameter of the particular organ. The obtained data is displayed in a graphic form as circle diagrams.

The typical energy level corresponds to the green ring in the middle. The inner circle is the area of **energy deficiency (hypo-energy state)**. The outer ring is the area of **energy excess (hyper-energy state)**. The diagrams are divided into the sectors related to a certain part of the human body. When you move the mouse cursor over the graph the program will highlight the current sector. Click the left mouse and the screen corresponding to the particular finger will appear.

Balance

This program presents same information as **Energy Status,** but in different way. It shows energy parameters for different organs and systems for both right and left hand. This allows seeing not only the level of energy, but right-left **Balance** as well.

Screening

This program allows to see particular sectors of different fingers related to body systems as well as to different organs. Numbers indicate the level of energy (in Joules). Colors have the following indication:

Optimal condition	Energy deficiency	Energy blockage	Hyper Energy

Fingers

This screen allows seeing Bio-grams of all 10 fingers divided to sectors. Click with left mouse button on the particular finger allows seeing informational screen.

You may see all the image or just particular sector

Spectrum screen presents the spectral distribution of the Bio-gram and related parameters. Intensity of light is measured in relative computer units from 0 to 255. This corresponds to the wave-lengths from 480 nm to 800 nm (depending on the CCD camera used in the instrument).

Isoline screen present sweep by degrees of Bio-gram inner and outer contours (see image above) as well as inner glow width.

Information screen present quantitative parameters for the whole Bio-gram and different sectors.

Specific interpretation may be attributed to every Bio-gram as well as to every sector:

Smooth and homogeneous	passive state
Smooth and wavy	active state
Bright and homogeneous	energy excess
Blocks	lack of energy
Several lines (beard-like)	acute problems
Tree-like structure	acute problems
Porous and cloud-like	energy deregulation
Separated dots	hidden infections
Space from the bottom line	old chronic problems
Complete block	ASC (external influence)

Energy

Demonstrate the level of energy for the particular person both in Joules and in %% related to the Database of apparently healthy people, measured from 0 to 100%.

0 – 20% - low energy (may be related to energy deficiency, as well as to meditative state);

30% - 70% - typical energy;

70% - 100% - high energy.

Balance

Characteristic of left – right balance of the body. Important characteristic in evaluation physical and mental conditions.

0 – 50% - very low balance – indication of serious mis-functioning;

50% - 80% - low balance – indication of functional disorder;

80% - 100% - typical.

Report

Preparation of printout for the customer. All information may be corrected. Pressing **Save** button allows to save document as PDF file.

Export to CSV

Allows to save all parameters for the processing in Excell, MathLab or any other program.

IMPORTANT NOTE!

Experience shows that modern computers can be unreliable, they are subject to virus attacks and irreplaceable breakage of hard disks. How many users have been terrified by the loss of all their materials, worked out through years! To react with a smile to the next trick of your computer or a "love-present" from the Internet ("I Love You" virus, having meanly damaged the disks and the spirits of thousands of people all over the world), you should periodically copy all valuable information and store it on stable memory media such as CDs, DVDs or external drives.

L-R symmetry

The observation of the L-R symmetry with regard to the body's axes is of great significance when analyzing the person's condition. At first sight, the way our bodies and faces are constructed appears to be symmetrical, but the similarity between right and left is quite relative. Try to compare two right and two left halves of a person's face (in a mirror reflection) and you will get two new faces having only a relative similarity with their owner. A method of psychological testing was developed on the basis of this effect, giving reasonably good results. A various sets of organs in our body are symmetric but their functioning condition always differs.

When analyzing EPI -grams, we look closely at symmetry; this can be done both with individual fingers and with the EPI diagram. The general rule is as follows:

- Pathologic signs manifest in one finger and absent on the corresponding finger of the opposite hand have a clear functional value.
- Pathologic signs having R-L presentation in the EPI images without filter are indicators of system functional weakness requiring correction.
- Pathologic signs having R-L representation in EPI images with filter show evidence of a pathologic process.

Note that in the EPI images with filter, sectoral presentation can be deceptive; it depends on the severity of the pathologic process. We will later examine this question in greater detail.

In EPI images without filter:

- The **right hand**, when analyzing processes linked to psychological particularities and conscious activity, carries information about the **left half** of the cortex of the cerebral hemispheres and says more about the person's physiological condition.
- The **left hand** carries information about the **right half** of the cerebral hemisphere and says more about the emotional condition.

A huge amount of work has been devoted to the issues of functional features of the right and left halves of cerebral cortex, a short analysis of them and their application to EPI -graphy is examined in the book [Korotkov, 2002].

The symmetry of EPI images turned out to be a significant indicator when researching the psycho-emotional condition of military personnel, in the work of colleagues in Moscow at the State Scientific Research Institute of Military Medicine of the Russian Ministry of Defence under the direction of Professor Igor Ushakov and the Ph.D. M.D. Vladimir Sen'kin.

- "*The difference of the integral glow area in the right and left hand fingers proved to be sensitive and significant in terms of prognosis relative to EPI -parameters. The relative size of the image area (JS paameters) of the right and left hands, found during pilot's background examination and after loading, constitutes a telling bioelectrographic criterion for stress tolerance.*

- *Good tolerance of pilots to load was characterized by lower JSR values in right hand in comparison with left hand (JSR<JSL) during background examination. The detected right hand functional asymmetry proved to be a valuable indicator reflecting the existence of high functional reserves.*

- *Low tolerance was distinguished by negative JSL dynamics in the left hand, at minus 0.5–0.6, with increased asymmetry and lower JSL values in left hand in comparison to right hand (JSR > JSL) during background examination.*

- *In accordance with the principles of evidence based medicine, a diagnostic efficiency assessment was performed, including an estimation of the operative characteristics of the bioelectrography method compared to 'the totality of traditional indicators of pilot overload tolerance as a reference. It was established that sensitivity of the bioelectrographic approach is at 86%, specificity is at 82%, and the prognostic value of positive and negative results is at 38% and 98% respectively; equal accuracy 83%.*

- *The bioelectrography approach makes it possible to put into practice one of the most important ultimate aims of scientific and practical military medicine: to make a prognosis of the result of the body's response to a stimulus with the aim of diagnosing functional reserves, preventing unjustified or damaging effects, selecting individual doses of restorative treatment, creating an objective basis for drawing diagnostic conclusions."*

Analyzing Human Energy Field

Human Energy Field (HEF) – is the most sensitive reflection of physical, emotional and, in some cases, spiritual condition of a person.

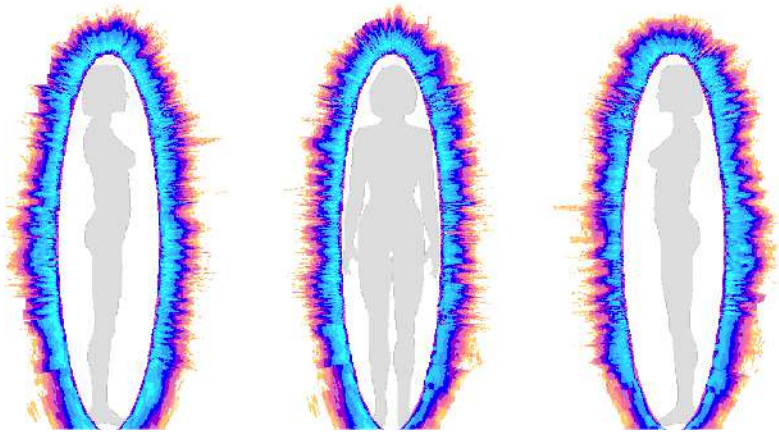
We take measurements from 10 fingers of both hands and using sophisticated software create an image of HEV. The principle is based on connection of fingers with different organs and systems of the body by Chinese energy meridians. This idea was firstly proposed by Dr Voll in Germany, later developed by Dr Mandel either in Germany, and then clinically verified and corrected by a team of Dr Korotkov in Russia. Therefore, the image, which we create in Bio-Well instrument, is based on ideas of Traditional Chinese Medicine and verified by 15 years of clinical experience by hundreds of medical doctors with many thousands of patients.

Bio-Well is not a medical instrument. It gives you an impression of your Energy Field and allows to see its day-to-day transformation and the influence of different situations and stimulus to your HEF and hence, to your condition.

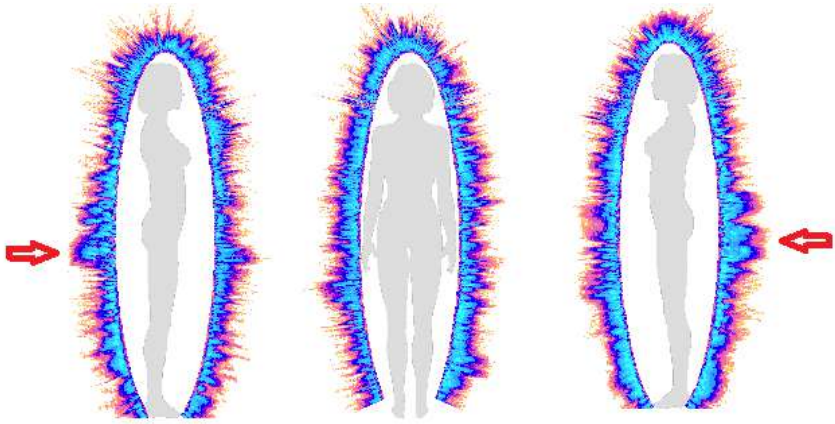
The **Energy Field** program is designed to process GDV images and to build a model of the human energy field using the information obtained from 10 GDV images of human fingers. The creation of the energy field is based on a diagnostic map. The **Energy Field** shows the human energy field as an image around the human contour and represents it in tables and diagrams in numeric form.

Let us see what is good and what is bad in Energy Fields.

Healthy strong condition



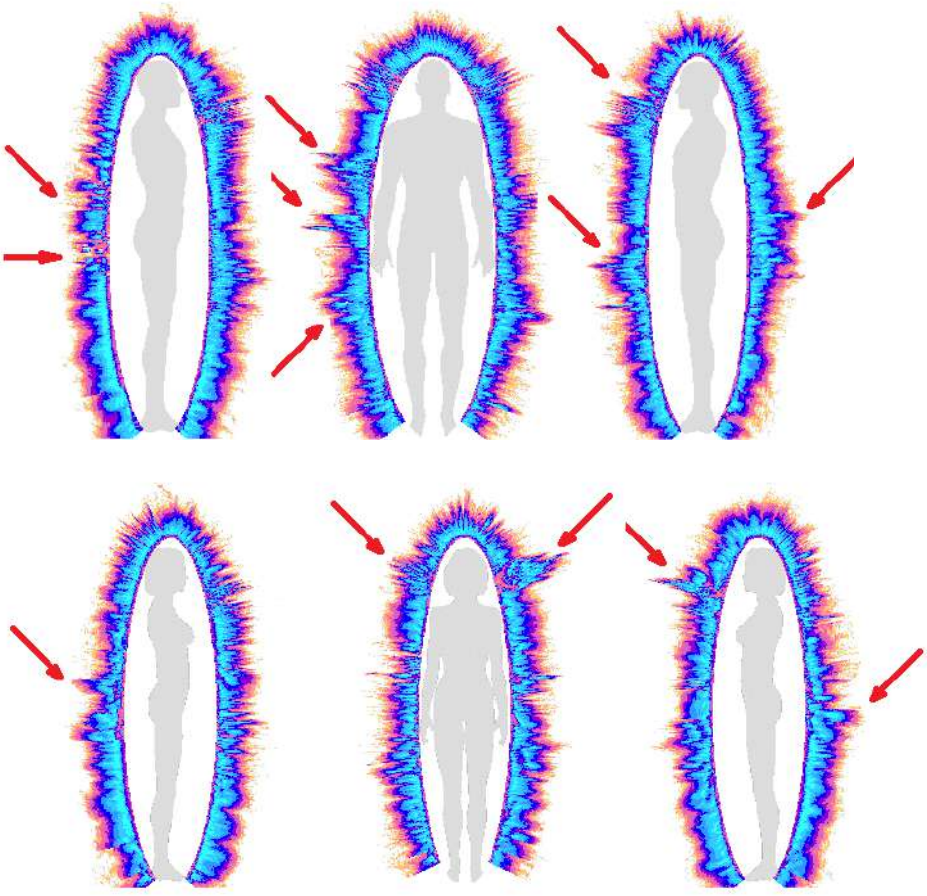
This field is uniform, without brakes, holes, strong out-bursts, of the optimal size. This is an apparently healthy person in a good mood state. This condition was achieved by a person after two weeks of exercises and meditation. Her initial condition was not as good.



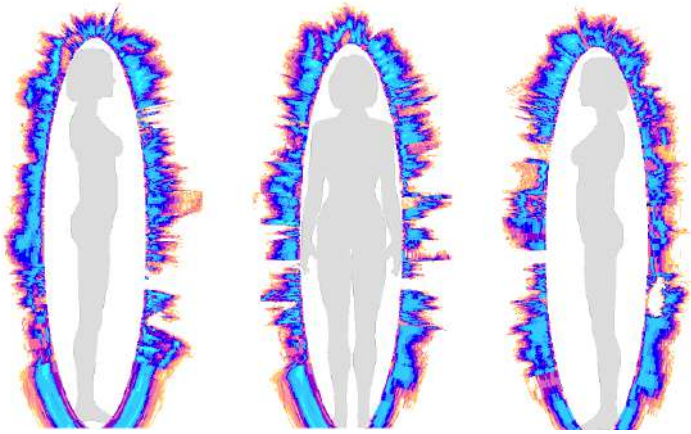
Same person two week before. As you see, this Energy Field is not as strong, but still, it is quite uniform. Please pay attention to strong out-bursts in the coccyx area – this is clear indication of a strong problem in the lower part of the spine. After series of exercises, this problem was practically reduced (see previous images).

At the same time, we understand that it is not so often you may find people having absolutely no health problems. These problems may be compensated – with appropriate diet, life style, medications, but anyway they will be

presented at the Energy Field. We may consider these people as apparently healthy, with appropriate treatment all their problems would be balanced and people would have an active healthy life. Please see a couple of examples of this kind below. Arrows indicate the areas of attention.

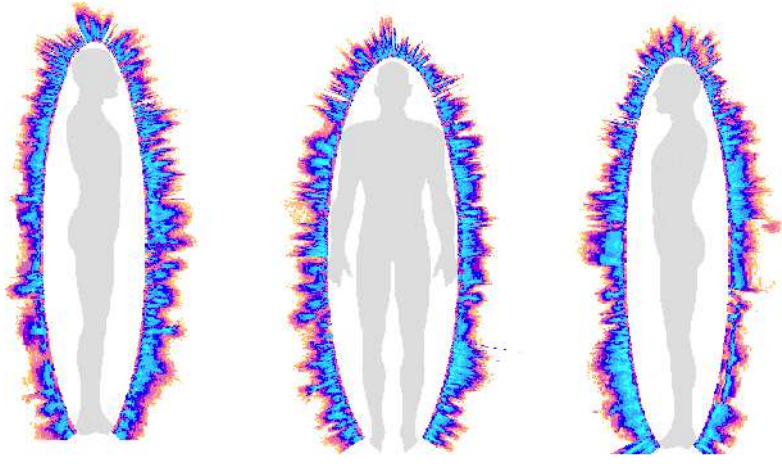


Health problems



As you see from these images, there are many holes in the Energy Field, the overall contour is uneven, a lot of jiggering in the head area. This person has many health problems, which need attention of a doctor. In particular, please, pay attention to the solid blue band in the lower leg area. This is an indication of the bad condition of the vines on the legs. Experienced person can make detailed analysis from the images of Energy Field, but this needs a special training.

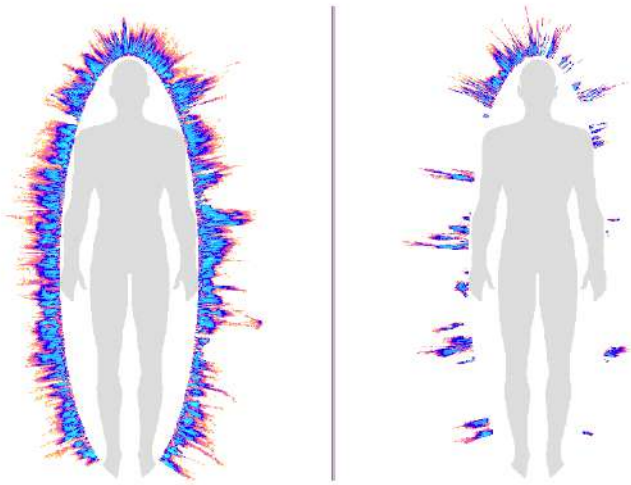
Another example.



As you see, the difference between Energy Fields of apparently healthy people and people having chronic health problems is very faint. Only specialist having special training can give health analysis based on the Energy Field images. For this, he or she needs to use a lot of information from other programs. The aim of the Bio-Well instrument – is to give an impression of your Energy Field and follow up its development in the course of different exercises and treatment.

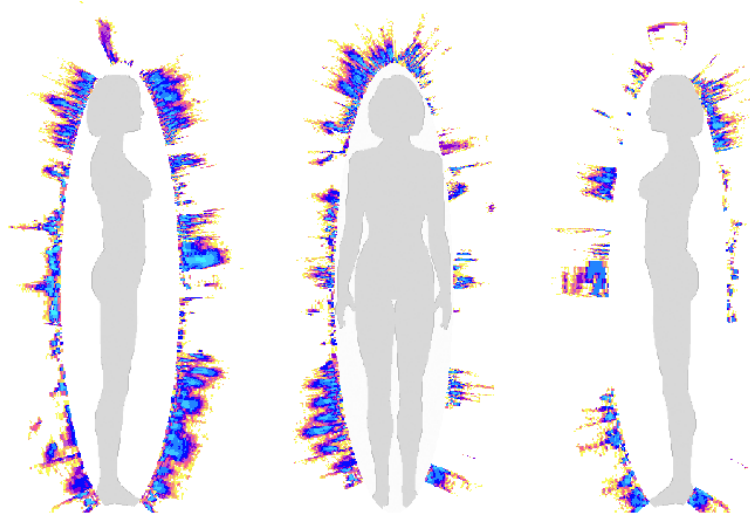
For example, you may take your image before and after sport exercise, meditation, pray, musical performance and see the effect of this process to your condition.

Below you may see transformation of the Energy Field of an orchestra conductor before and after symphony performance. As you see, artist spent a lot of energy for the performance.

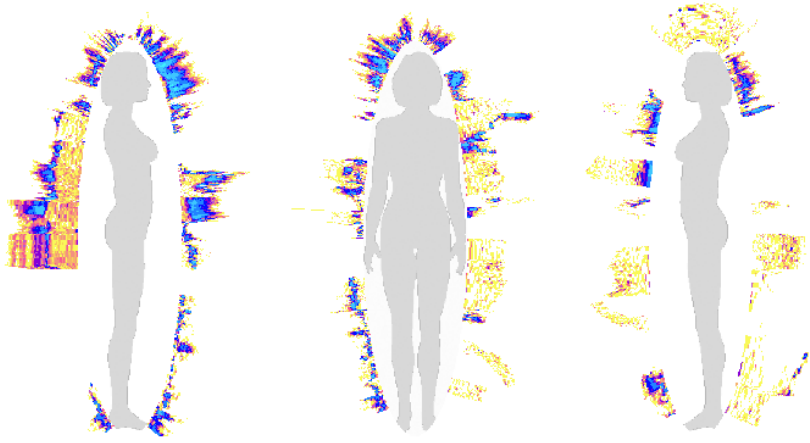


Stress Level evaluation

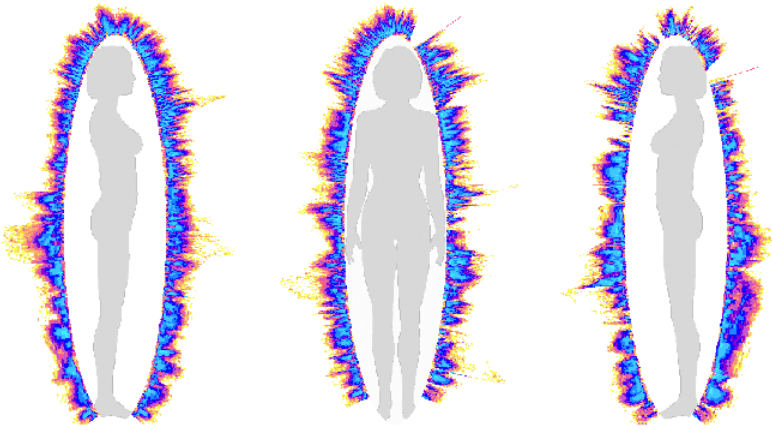
Stress is a complex factor that has both an emotional component (anxiety) and a somatic component that results from prolonged exposure to permanent anxiety. Stress has very strong impact on the Energy Field. Images look very specific. Let us see several examples.



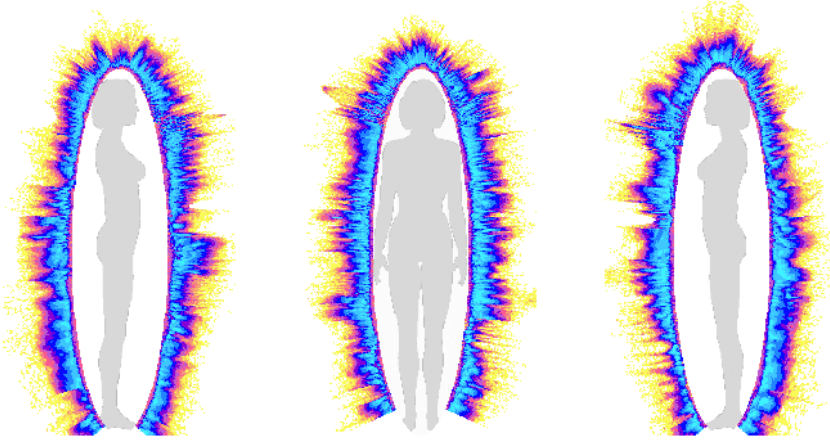
As you see, the image is very disordered and hollow. This has nothing to do with health condition, but permanent stress and anxiety may have very negative implication to health.



Another example of much-stressed person. After seeing this image, she understood that this condition might have very negative effect. She started a course of meditation and special anti-stress therapy. In half a year situation changed dramatically (see below).

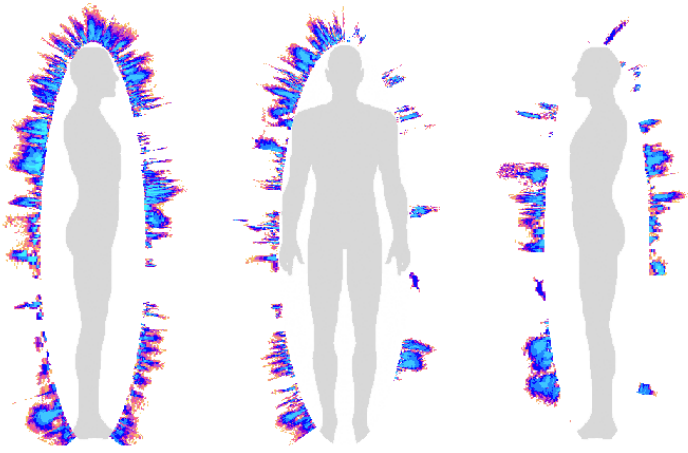


Being relived by the effect she proceeded with therapy and half a year later improvement became even more clear (see below).

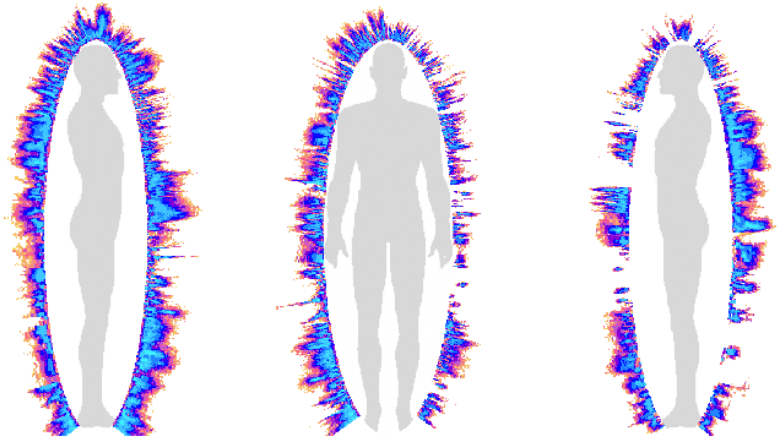


This is a good example how you may follow up transformation of your condition under the influence of different treatment.

Another example of an Energy Field of a yang man who had serious problems with his business in the moment of analysis.



Seeing this image, he decided to change his attitude to business situation and take care of himself spending more time in sport club. In three months, result became clear.

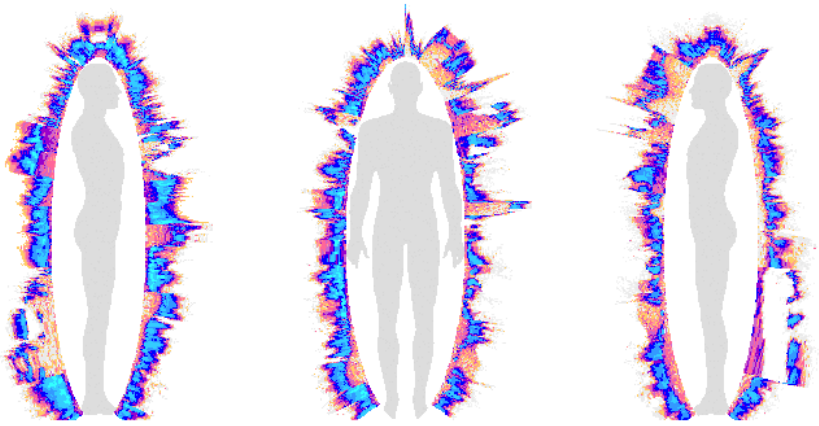


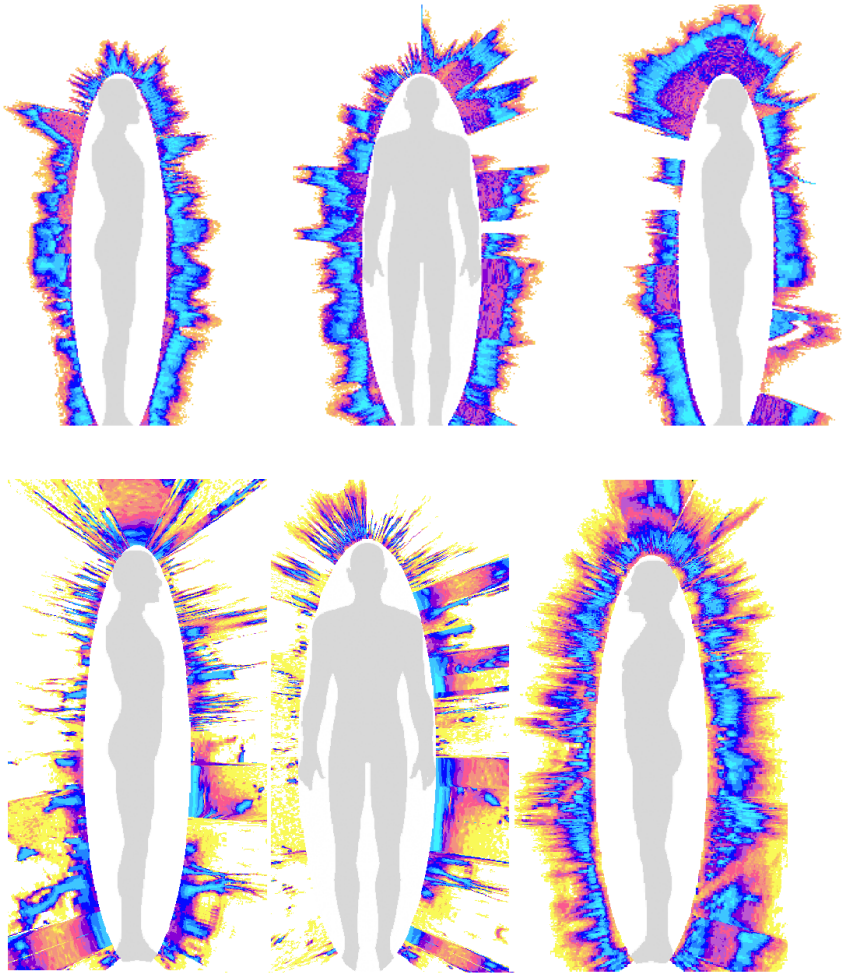
From many years of experience in using Energy Field analysis, we may conclude that the aim of any therapy, exercise or treatment should be improvement of the Energy Field image. This is a clear indication of the positive effect of a therapy. This may take some time – we should not always expect immediate effect, but in long run Energy Field should become uniform and balanced.

At the same time, very big Energy Field is not always an indication of good health. As any health related parameter, the Energy Field should be in some range. This situation may be tricky – only specially trained professionals may detect serious health conditions like cancer, cardio-vascular problems and the like. A system of Internet-based health analysis is under development.

Altered State of Consciousness

This is a very specific condition of a person originated from several situations: from one hand, deep meditation, pray, highest level of creativity, and, from the other hand, the influence of psychedelic drugs, narcosis, hypnosis, external mental influence and possession. In most cases, Altered State of Consciousness has specific representation on Energy Field. Let us look at some examples.





As we see from these examples, in ASC images are strongly distorted, left and right side is not balanced, the overall appearance is clearly different from the normal conditions. Altered Sate of Consciousness is a topic of special consideration of neurologists and psychiatrists.

Heightened Awareness Zones

From the analysis of the condition of 'apparently healthy' people, it is clear, that specific problem may detected in every case. This is a typical situation, which arises in the vast majority of the population during analysis. The fact is that many functional abnormalities cannot be diagnosed using the methods of clinical medicine, which focuses mainly on organic abnormalities. **Somatic condition of the particular organ may be quite normal, but functioning may be suppressed.** Patients with autonomic control disorders are considered apparently healthy, however they can experience a whole set of uncomfortable symptoms which impede their ability to work, increase tiredness and worsen their quality of life. A visit to a conventional doctor will probably not give any results, because the values of all the standard analyses are within the prescribed limits. And the psycho-emotional dimension has a strong impact, leading to the high variability of conditions over time, which can be seen from the diverse examples above in EPI images without filter.

> *By identifying energy deficit zones, the EPI method makes it possible to detect areas of increased risk. Among these are the zones in EPI images without filter situated in an energy deficit area (or energy excess in middle-aged people and the elderly), in particular those repeated for both hands.*

Pathological processes may not necessarily develop in these zones, but under load or stress this is nevertheless the most likely course of events. This can be avoided by appropriate control and prophylaxis.

For example, in the case of an energy deficit in the area of the cardiovascular system, good health can be maintained well into old age with a specific diet and relaxation regime. Unfortunately, practice has shown that in many cases people did not pay attention to warnings given after EPI analysis, and went on to develop severe problems.

We can identify several zones highly likely to attract attention when analyzing EPI images in the majority of middle-aged people with a European lifestyle.

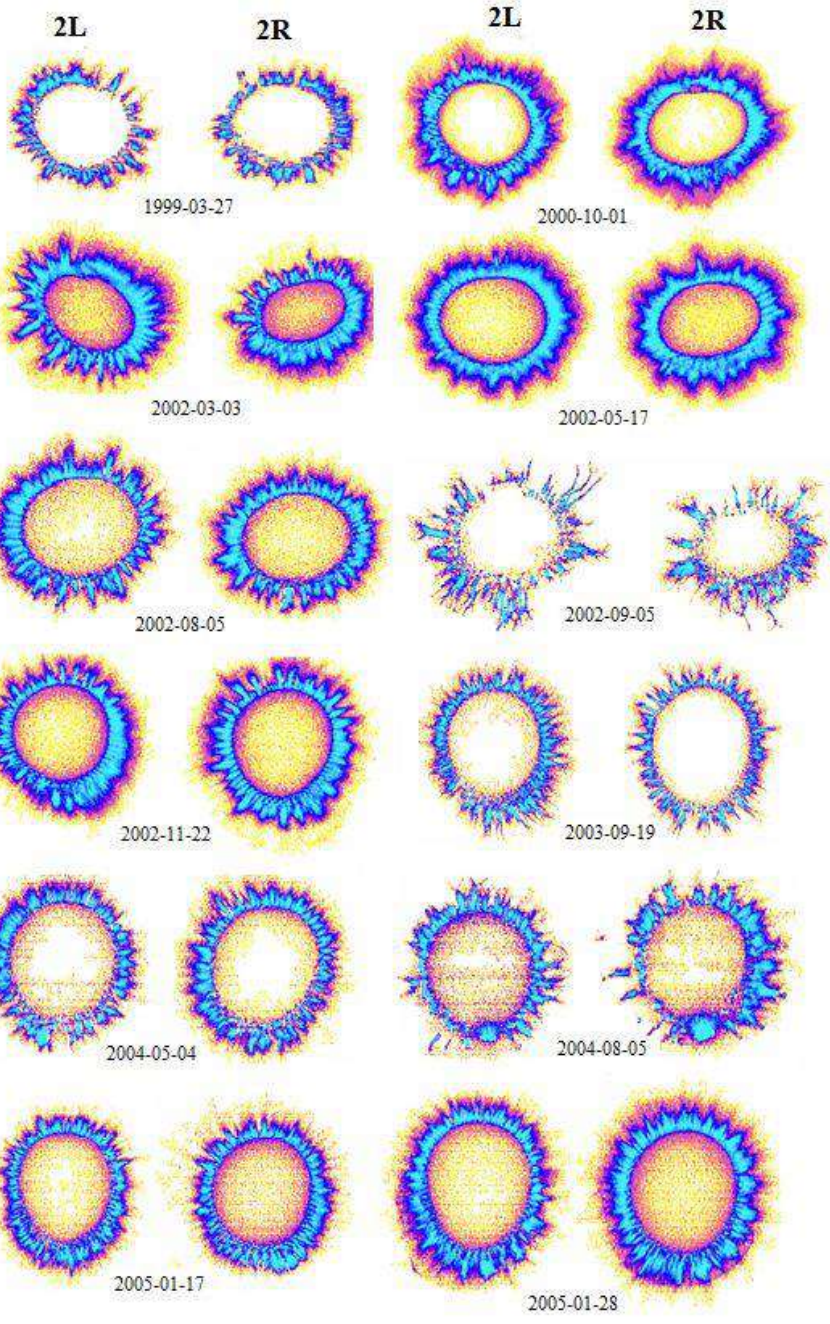
The area of the vertebral column.

A sedentary way of life, jolting in a vehicle, micro traumas, knocks and contusions lead to spinal curvature of the column and damage of the cartilage between the discs. In many people this manifests itself in occasional pain, to the extent of acute episodes, while others only experience mild discomfort. However, even minor damage can lead to severe consequences. The vertebral column is a basic organ for the control of autonomic activity, and in Ayurvedic medicine it is the area where we find the energy centres: the Chakras. A deformation of the vertebral column leads to abnormalities of nervous control, that is, to disorder of the combinatory work of the systems and organs. Most often affected is the area of the coccyx, which is linked to the work of all the organs of the small pelvis. This leads to the poor functioning of the stomach, bowels and the urogenital system.

In the EPI images the vertebral column is represented on fingers 2L and 2R. Severe abnormalities are displayed both in the field image and the EPI diagrams; however the final conclusion must be based on the information from the fingers. Because the EPI makes it possible to get information about the functional condition of the systems, which is primarily linked to the activity of the autonomic nervous system, the visibility of the signs will depend on the current condition at that given moment. But in case of existing dysfunction, the visibility will be displayed differently – depending on the severity of the condition. Let us illustrate this thesis with an example.

Example *009*

Let us examine the EPI images of a person's index fingers, taken at different points over some years. During the years 1996-1999 this person suffered from increasingly severe episodes of radiculitis which were managed by only the administration of hydrotherapy and special gymnastics. After the year 1999 the episodes did not recur, although the patient periodically experienced unpleasant sensations in the area of the vertebral column, to the extent of pain. These pains were removed by rubbing the affected areas with peppermint and doing exercises. In 2000-2004 this person survived a severe immunity crisis. All the EPI images presented were taken without filter.


2L
2R
2L
2R
1999-03-27
2000-10-01
2002-03-03
2002-05-17
2002-08-05
2002-09-05
2002-11-22
2003-09-19
2004-05-04
2004-08-05
2005-01-17
2005-01-28

1999: clearly visible defects in the internal areas of the fingers. Period of strong radiculitis pains. We paid attention to the overall energy deficient character of the EPI -grams.

October 2000: immune inflammation; area of the vertebral column relatively stable, although evident small emissions.

March 2002: immune inflammation, clearly visible emissions in the area of the vertebral column and the bowels.

May 2002: holidays in the Crimea: sudden energy boost, small defects in the area of the coccygeal bone.

August 2002: defects more strongly apparent.

September 2002: severe immune inflammation.

November 2002: relative stabilization of condition.

September 2003: unstable condition with depressed energy and periodic immune inflammations.

May 2004: gradual improvement of condition.

August 2004: strong physical activity, reproduction of radiculitis pains which were removed with massages using peppermint. Pronounced defects in the projection of the vertebral column.

January 17 2005: holidays by the sea, general energy boost.

January 27 2005: strong physical activity, evident reaction in the projection of the vertebral column.

January 28 2005: special exercises lead to practical disappearance of the pathologic signs in the area of the projection of the vertebral column.

This example shows that the expression of defects in the area of the projection of the vertebral column can be different depending on the overall condition, however in case of problems, this indicator will always be apparent to some degree. At the same time, on the EPI images with filter, the given problem will be presented in periods of crisis; when the condition is normal it will not appear. This is linked to the fact that in the given example the illness does not affect the organ tissue level and appears as a functional abnormality of autonomic control.

It is advisable to pay attention to the energy condition of the vertebral column and apply the methods of osteopathy and manual therapy in the earliest stages of condition correction.

The next area requiring attention in a population with a European diet is the **projection of the gastrointestinal tract (GIT).**

It is present in the internal side of fingers 5L and 5R; the external side of the fingers 2L and 2R and in one of the sectors of fingers 3L and 3R. Typical European eating habits are plagued by a host of deficiencies: excess fat, carbohydrates, sugar, refined food, and lacking cellulose, raw vegetables and fruit. This situation is exacerbated by the intake of preservatives, dyes, stabilizers, antibiotics, hormones and lately also genetically modified products. In the USA these factors have reached a stage which has increasingly severe consequences for the American population. A good saying is: "the longer the life of a product is the shorter the life of its user will be."

All this means that the GIT in people with a standard European diet is in a condition of almost continuous dysfunction, and the person experiences a huge amount of inconvenience and discomfort, to the extent of functional and organic abnormalities.

Therefore, in most of the people examined in Europe and the USA, we observed defects in the area of the GIT projection, which attested to functional insufficiency. Evidence of these defects is determined by the genetic status (there are some people who can eat nails washed down with gasoline) and the character of the food itself. As a rule, it can be said that all GIT problems can be eliminated by choosing a sensible diet.

Pay attention, too, to the fact that the condition of the GIT is in direct correlation to the condition of the nervous system. Therefore, defects in GIT projection will be more strongly displayed in EPI images without filter.

The thyroid gland.

The thyroid gland is related to the area of projection of the lower sectors in EPI images of fingers 1L and 1R. The presence of aggressive defects in this zone without filter unambiguously indicates functional damage. Conventional medicine has well-developed procedures for correcting abnormalities in the thyroid gland, when detected in a timely manner.

Among the **zones requiring heightened awareness** during analysis are:

- the cardiovascular system: fingers 5L, 5R and also 3L and 3R;

- urogenital tract: fingers 4L and 4R. Pay attention to the impossibility of analyzing this zone in women during the menstrual period. In men defects are manifested in this zone in the case of prostate inflammation.

- Projection of liver and kidneys: lower sector of fingers 3L and 3R. It should be noted that all the organs which deal with food and excretion work as a single system. A dysfunction in one organ will inevitably be linked to functional abnormalities in the others. As a result of a reaction of these systems to the nature of the food, load and stress, the defects observed in these projections are very labile: in EPI images without filter, they can change in the course of a few hours.

Let us illustrate this thesis with an example (Fig. 010).
Data presented by V. Yakovlev and N. Priyatkin.

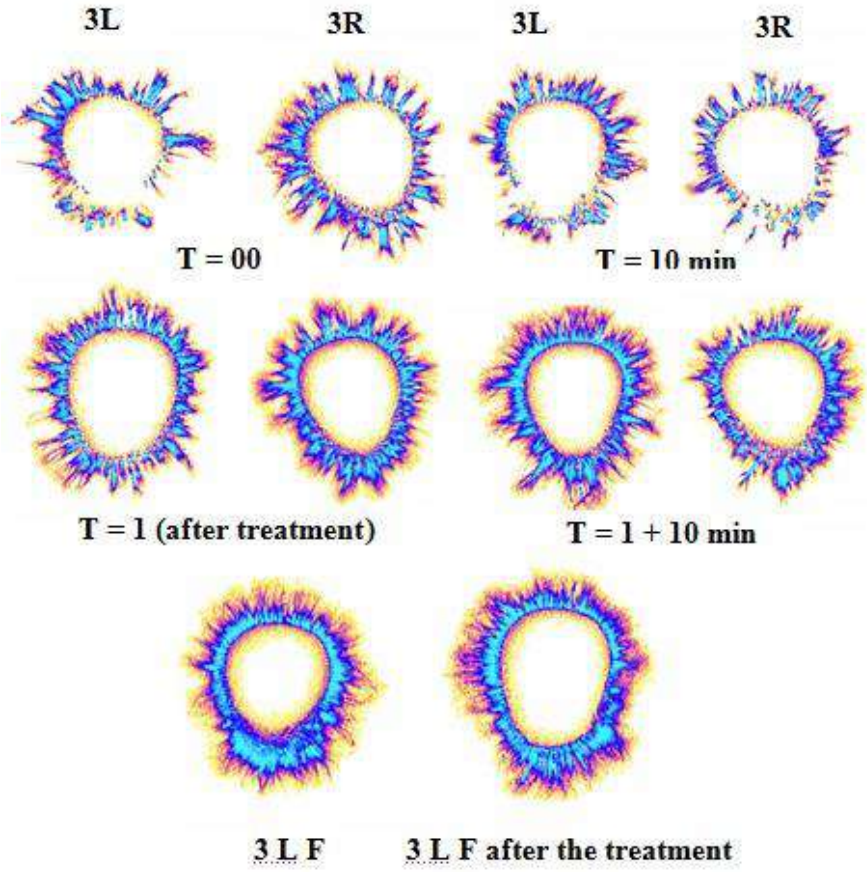
Example (Fig. 010)

Woman, 45 years old, Russian, chronic kidney disease, dysfunction of liver, stones in the urinary bladder.

Three consecutive EPI images were carried out without filter at five-minute intervals. In the zone of the lower sector, clear defects, especially strong in the zone of the right kidney projection. During subsequent EPI images, the energy loses power. This process is linked to the overall energy deficit and the exhaustion of the energy system when electronic flows are stimulated. A change of the parameters of the EPI must be evaluated quantitatively because visual assessments are deceptive and not reliable. Use the assessment the EPI Scientific Laboratory *program, loaded with the finger images (bmp files). For finger 3R the calculations make it possible to obtain this following set of parameters (Table 2).*

Table 2. A change in time of the parameters of the EPI images prior to therapy (T=00, T=00+5, T=00+10 and after the therapy session T=1, T=1+5, T=1+10)

EPI images taken	T=00	T=00+5	T=00+10	T=1	T=1+5	T=1+10
Area (pixels)	11358	9106	7008	18872	18707	13814
Form coef.	16.09	18.68	26.09	12.07	11.74	12.01
Entropy	1.91	2.19	3.02	1.09	1.07	1.34



In the picture the 3LF EPI -gram is presented having an area of clearly apparent defects in the lower sector. After the treatment (Fig. 3LF after) the intensity of the defects decreased although they remained.

As is clear from the data in this table, during successive measurements before treatment the area of the images falls while the shape's form coefficient and entropy rise.

A course of restorative therapy was carried out on the woman with a massage of acupuncture points, aromatherapy and herbs. After the treatment her energy level rose dramatically (the area increased from 7000-11000 to 18000), and the form and entropy coefficients decreased. This testifies that the course of treatment definitely had a positive effect. At the same time, the defective image remained, which is obvious from the third capture after therapy (T=1+10). During the first two successive shots after therapy, the parameters

remained apparently unchanged (table 2), which shows evidence of the overall increase of energy, although at the third capture they somewhat worsened.

This is not surprising, however. The condition of the patient was quite severe; she had a chronic illness apparent at the level of the organs. The EPI images with filter are evidence of this.

Stability of data

The repeatability of values of the EPI-parameters during daily monitoring was studied, at the St.Petersburg Federal Medical University, establishing baselines with practically healthy individuals and patients suffering from bronchial asthma (BA). For healthy individuals average amplitude of variations in the EPI-gram parameters showed a daily average of **4.1%,** and the 10 minutes average amounted to **6.6%.** For the BA patients these values amounted to **8.6% and 7.7%.** For several individuals (about 10% of the entire group of the people studied), where some were healthy, some had BA, the daily variability of the EPI-grams parameters was considerably higher – up to 18%. All these individuals had pronounced liability in their psychological status, as well as vegetative instability. Statistically significant correlation coefficients ($r>0.5$, $p<0.05$) were discovered between the indices of the vegetative balance and the EPI-grams' parameters, which confirms the fact that the autonomic nervous system plays an important role in the system regulation mechanisms of an individual. Good repeatability and reproducibility of the EPI-gram parameters was observed for the absolute majority of examined healthy individuals and individuals with BA (in 90% of cases). High sensitivity of the EPI-grams toward changes in the psychoemotional state of patients should be taken into account.

Considering the stability of the instrument itself, variation of EPI-gram parameters taken with the titanium calibration cylinder was less than **1%** at night and less than **3%** in the daytime, providing calm environmental conditions.

When the body is functioning normally, that is, when there is a good level of autonomic control, we can observe fluctuations in the energy level in images without filter from one day to the next, in a number of cases and over the course of several days. This is linked to the physiological cycles (clearly

presented for women) and CNS and ANS reactions on the changing environmental and stress conditions. You can observe this process in the measurements of the EPI images without filter.

Depending on the homeostasis level and age, a person's condition changes to varying degrees. These fluctuations are reflected in the EPI images without filter. They reflect the level of regulation of the functional systems of the body by the ANS.

In an apparently healthy person with fluctuation of parameters without Filter, the parameters with Filter remain practically unchanged over a long period during a change in environmental conditions. A change of the parameters with filter is evidence of severe changes in physiological conditions.

For a mentally stable and healthy person of middle age the EPI parameters are quite stable. As an example, you may see several diagrams taken during the year. As you see, they are quite repeatable.

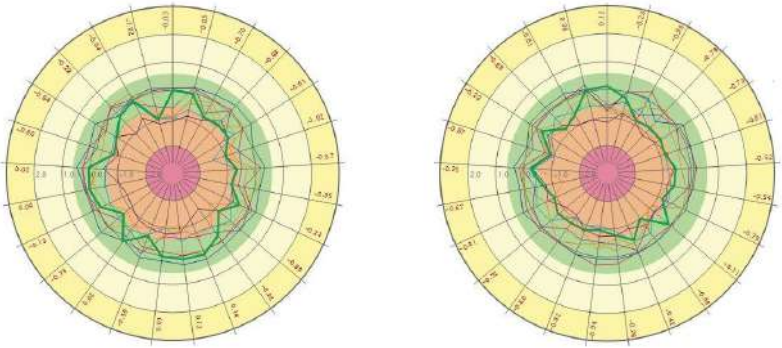


Fig. Diagrams taken during the year.

The change of a diagram is an indication of some processes occurring at either the psychological or the somatic level.

> *Typically, a decrease of parameter values in the diagram without filter – transition into the deficiency zone – represents mental and psychological frustration, which may then have a negative influence on the body at the somatic level.*
>
> *An increase of diagram parameter values (both with and without filter) – transition into the hyper-energy zone – may be an indication of developing somatic problems. We should be very attentive to patients*

having diagram curves in the hyper-energy zone – this may be a very troublesome indication.

Fig.2.14 gives an example of diagrams for the same person as in fig.2.13 before having severe inflammation of the bladder. You may track the transformation of state for this person by processing EPI images in EPI programs from the "011" folder on the CD.

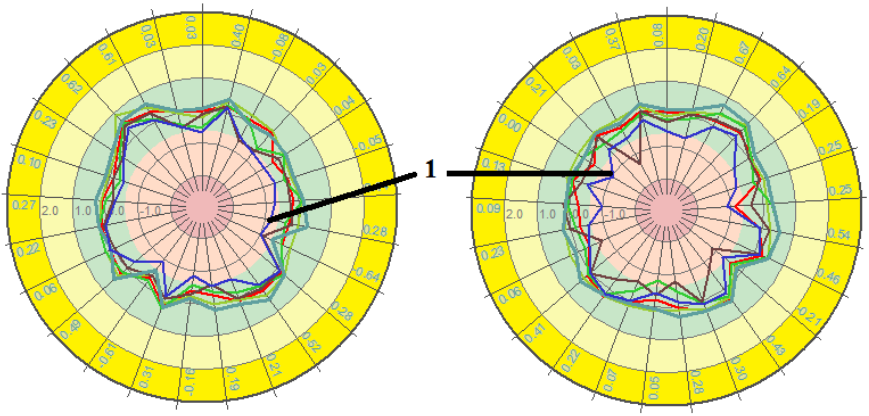


FIG. Several diagrams of a person taken during **4** months period.
1 – measurements taken **just before the inflammation.**

Recommended procedures for recording BIO - grams:

1. Calibrate the GDV device at least four times a year, or if conditions change, e.g. moving the camera to another site, change of computer, severe change in atmospheric conditions. Calibration must also be performed if 'unusual' results are obtained.

2. Check the capture parameters in the GDV Camera (in accordance with the device instructions) and the processing parameters in programs. **Changing the processing parameters leads to distorted results.**

3. Take BIO-grams of the patient at least 2 hours after the consumption of a large quantity of food, without alcohol or strong medicines. **Some medicines (in particular, hormones or anti-depressants) will have an effect on**

the nature of the energy. It is advisable to empty the bladder and bowels before image capturing begins.

4. The examination of the patients may be conducted during all the day, but preferably before any medical diagnostic procedures and the intake of drugs, at least two hours after the latest intake of food and smoking, and at least 24 hours after the latest intake of alcohol. The intake of certain drugs influences the psychophysiological state.

5. The fingers must not be washed or wiped with alcohol before the registration. If the hands are very dirty, wash and wait a further 15 minutes.

6. **In the case of sweaty hands** (excessive perspiration), wipe each finger individually and then take BIO-grams.

7. Before taking BIO-grams it is advisable to allow the patient to relax for 15 minutes, drink water (but not tea or coffee) and sit in pleasant surroundings with relaxing music.

8. Some people, particularly children and the young, may demonstrate a 'medical reaction' which manifests itself as a stress reaction on the measurement process.

9. Before each measurement, the optic lens of the GDV device must be wiped clean.

10. If unusual BIO-grams are obtained, repeat the measurement of the patient and be sure that the results are precise.

11. It is necessary to use a new filter for taking BIO-grams of ten fingers of each patient. Ensure that the filter is accurately stored, straightened out and does not become crushed during the measurements.

12. Repeated image capturing may lead to varying results. Decreased clarity with repeated measures testifies to weak energy. Uneven changes of the BIO-grams indicates deregulation of adaptation levels. In such cases, it is necessary to carry out a series of repeated measurements and draw conclusions accordingly.

13. Psychologically and physically comfortable conditions must be provided for the individuals under study, and any random influences (psychological, physical, etc.) must be excluded.

14. When the state of the individual is monitored by periodically taking the BIO-grams, the measurements must be taken at the same time of day, by the same physician, in the same room with constant optimum temperature, humidity and gas composition of the air, maintained by means of the ventilation and heating systems.

Statistical distribution in BIO-grams' parameters

GDV Bio-Well program based in Internet allows to make statistical analysis of different parameters of the Bio-grams collected in different experiments. For the moment of this analysis it was 8500 measurements of human fingers in the database, of both gender in the age from 25 to 100 years. Some people were tested multiple times. Analysis was done on all database without separation by age or gender.
Fig.1 presents histogram of GDV parameter Human Field Energy.

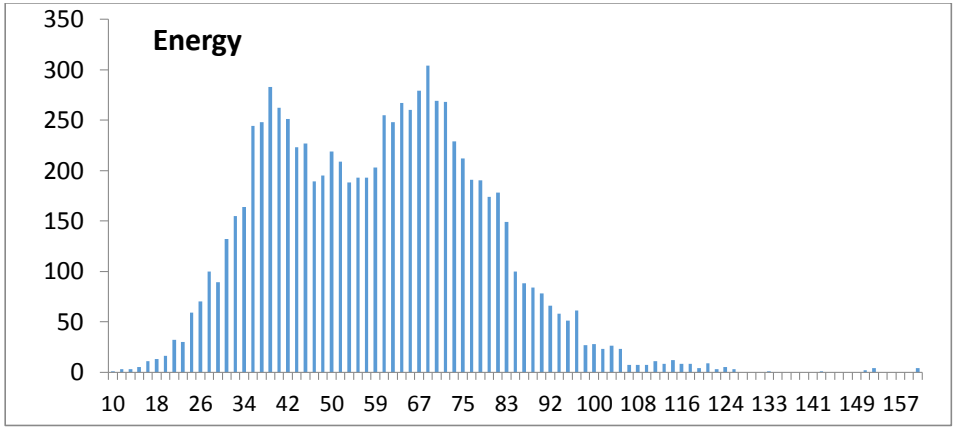


Fig.1 Histogram of GDV parameter Human Field Energy based on 8500 experiments. Abscises axes represent energy in Jouls, ordinate axes – amount of measurements with particular level of energy.

As we see from Fig.1, histogram has two distinct maximum. Detailed analysis demonstrated that the first maximum is typical for people having different deceases or increased level of stress, this we may define as slight energy deficiency. Second maximum is typical for people having high level of inner energy: athletes, politicians, businesspersons, public presenters.

Similar appearance had the histogram of energy distribution for every single finger.

Based on these data we have chosen the range of energy, typical for apparently healthy people as E = (40 – 70) Jouls.

Fig.2 presents histogram of Stress Index distribution.

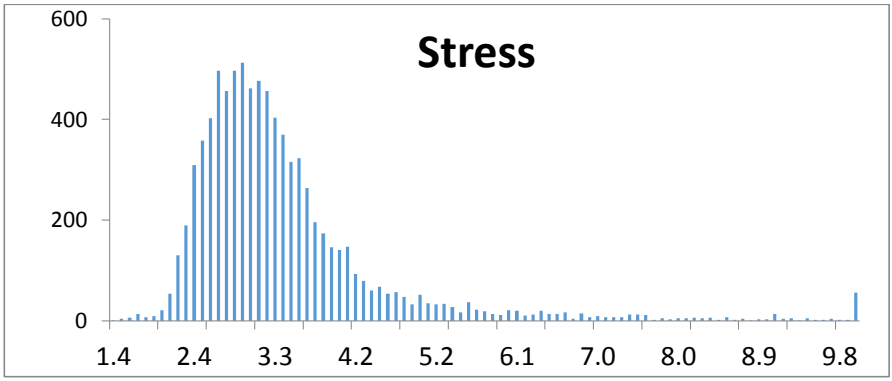


Fig.2 Histogram of Stress Level GDV parameter based on 8500 experiments. Abscises axes represent Stress Level in the scale from 0 to 10, ordinate axes – amount of measurements with particular level of stress.

As we see from Fig.2, histogram has well-presented maximum, but there are many measurements with high level of stress up to the maximum values.

Based on these data we have chosen the range of stress index, typical for apparently healthy people as: Str = { 2 - 4}.

Fig.3. presents histogram of distribution of the Balance parameter.

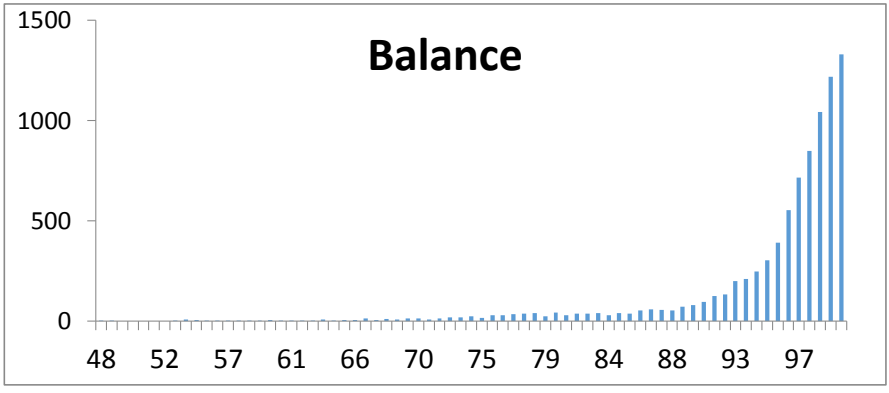
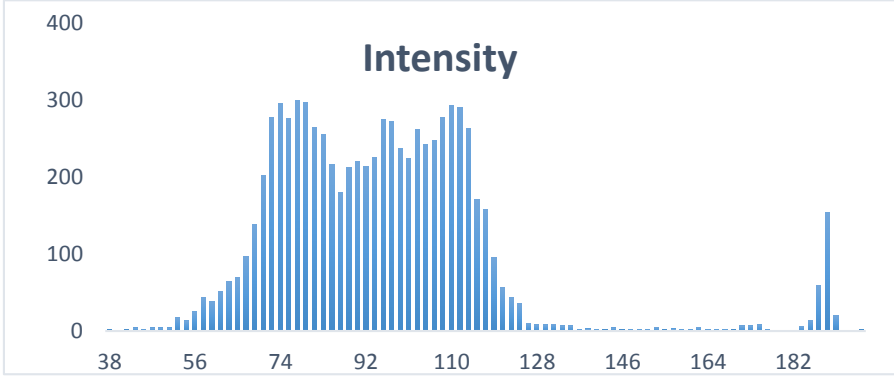


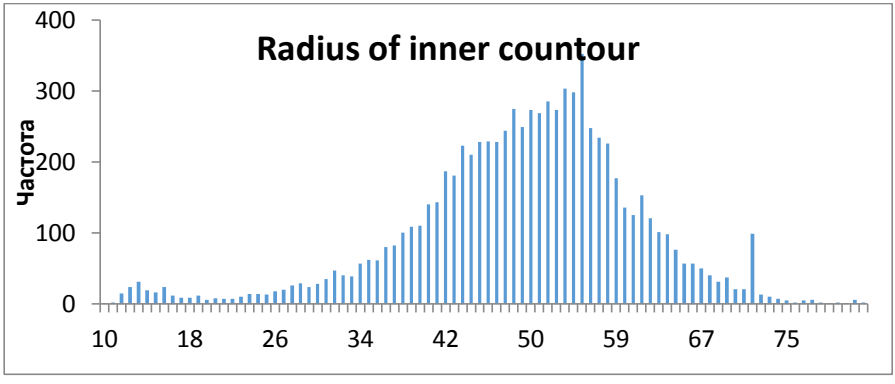
Fig.3 Histogram of Balance GDV parameter based on 8500 experiments. Abscises axes represent Balance parameter in the scale from 0 to 100, ordinate axes – amount of measurements with particular level of balance.

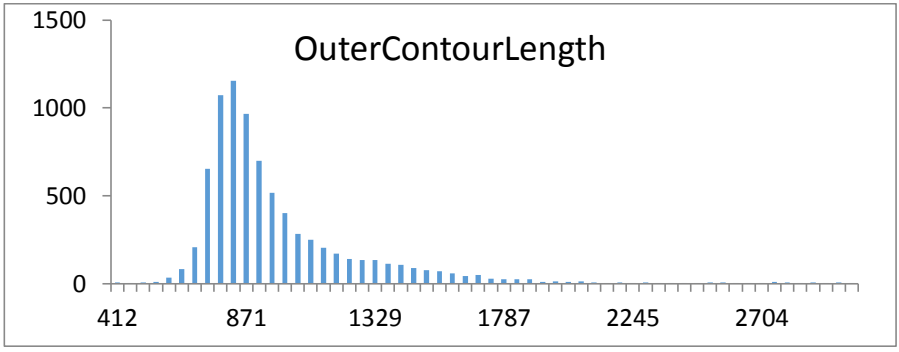
As we see from Fig.3, most of measured parameters belong to the diapason higher than 90%.

Based on these data we have chosen the range of Balance index, typical for apparently healthy people as: B = {90 – 100%}.

Histograms of parameters distribution for different fingers look identical. Below we present examples for the right thumb (R1). From these data it is clear that in statistical processing of data we need to use non-parametric methods of analysis. And the more the diapason of the particular parameter variation, the more it should be sensitive to the evaluation of different human states and may be useful for the research process.



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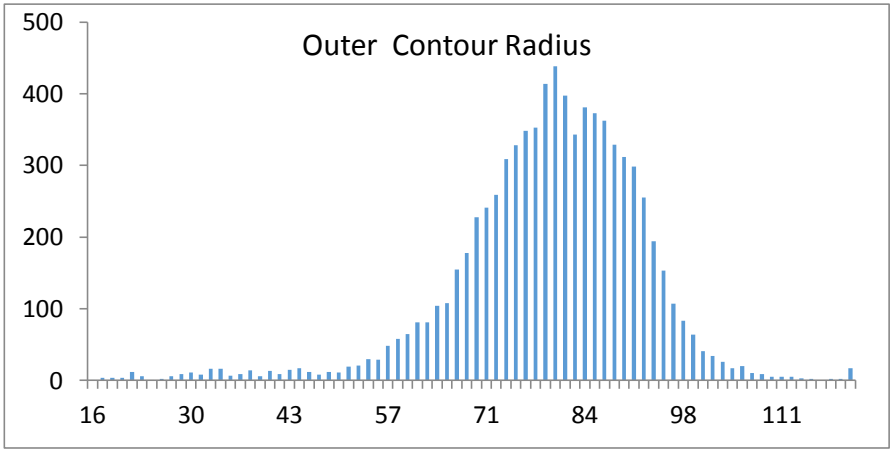
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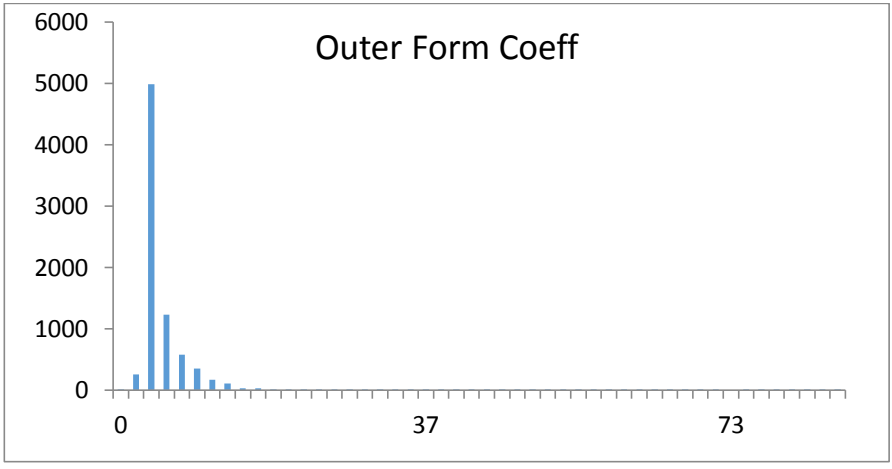
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Part III

The Concept of Homeostasis Levels in Electrophotonic Bioelectrography

There is something in this more than natural,
if philosophy could find it out.

William Shakespere
Hamlet II, 2

Homeostasis: any self-regulating process by which biological systems tend to maintain stability while adjusting to conditions that are optimal for survival. If homeostasis is successful, life continues; if unsuccessful, disaster or death ensues. The stability attained is actually a dynamic equilibrium, in which continuous change occurs yet relatively uniform conditions prevail. [Encyclopedia Britannica, 2005].

Homeostasis in physiology: a relative dynamic constancy of the composition and the properties of the internal environment, and stability of the basic physiological functions of the body of a person, animals and plants.

Homeostasis or **homoeokinesis** is the property of an open system, especially living organisms, to regulate its internal environment so as to maintain a stable condition—by means of multiple dynamic equilibrium adjustments controlled by interrelated regulation mechanisms. [Principia Cybernetica Web: http://pespmc1.vub.ac.be].

The concept of homeostasis—i.e., that all living things maintain a stable internal environment—was first suggested by Claude Bernard, a 19th-century French physiologist, who stated that "all the vital mechanisms, varied as they are, have only one objective: that of preserving constant the conditions of life." The term was coined in 1932 by Walter Cannon from the Greek roots *homo-* (same, like) and *sta-* (to stand or stay).

As originally conceived by Bernard, homeostasis applied to the struggle of a single organism to survive. The concept was later extended to include any biological system from the cell to the entire biosphere, all the areas of the Earth inhabited by living things.

The concept of homeostasis is also applicable to associations of living bodies, for example, the preservation of constancy of specific composition and number of individuals in the biocenosis of an ecosystem is also called Homeostasis. Genetic homeostasis is the capacity of a population to maintain the dynamic equilibrium of genetic composition, which ensures the highest possible degree of viability. The term 'homeostasis' is also employed in cybernetics to denote any self-regulating mechanism. We can apply the principles of cybernetics and the theory of non-linear systems to a description of the functioning of a body.

In real life many people have a condition that is characterized by various lapses in optimal functioning. These lapses are characterized by numerous different physiological parameters, which make it impossible to evaluate them from the point of view of a single system. Many doctors agree that an elaboration of complex methods is required to evaluate the conditions of the body. One of the techniques for the comprehensive description of different conditions is the principle of the homeostasis level.

Properties of homeostasis

Mechanisms of homeostasis: feedback.

Homeostatic systems show several properties:

- They are ultrastable;
- Their whole organization, internal, structural, and functional, contributes to the maintenance of equilibrium;
- They are unpredictable (the resulting effect of a precise action often has the opposite effect to what was expected).

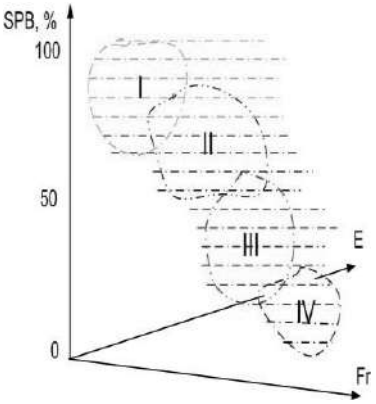
Main examples of homeostasis in mammals are as follows:

- The regulation of the amounts of water and minerals in the body. This is known as osmoregulation. This regulation is managed in the kidneys.

- The removal of metabolic waste, called excretion. This is accomplished by the excretory organs such as the kidneys and lungs.
- The regulation of body temperature. This is mainly managed by the skin.
- The regulation of blood glucose level. This is mainly managed by the liver and the insulin secreted by the pancreas.

Levels and Zones of Homeostasis

From a systemic point of view, we can describe the body's condition as a set of discontinuous homeostasis levels (otherwise called adaptation levels). During vital functions, physiological parameters are constantly fluctuating, which is clearly cyclic in nature in a healthy body. In the morning we need time to 'get moving' and connect with activity. Then comes the time to get active, which has its own peaks and troughs. At 5 or 6 pm we often start to lag physiologically, and this then gives way to a surge in the evening. These phases are manifested in different ways in different people, and they depend on the character of the load, diet and stress reactions. Throughout this time the body fluctuates within several homeostasis levels, whilst remaining within the limits of one zone.



All the physiological parameters are within the norms, within the limits of one homeostasis zone. A vivacious and energetic person actively deals with a viral infection and changes in environmental conditions. This is the state of health, and such a state should be natural to everyone.

This principle can be presented in the form of a conventional graphic. It is by its very nature a graphic in a multidimensional space of signs. Let us present it in a three-dimensional space. Along one axis of the abscissa lies the quantity of the overall entropy of the body, along another axis is the quantity of the Fractality. The axes of ordinates conventionally reflect the quantity of the balance of the sympathetic and parasympathetic sections of the nervous system.

The levels of the homeostasis are coordinates of the condition in this space of signs, and during vital function these coordinates constantly change within set limits.

As an axis of the graph we can choose other parameters that characterize the functioning of the body, for example, the systolic-diastolic pressure, blood PH or sugar level. The main thing is that these parameters are sufficiently comprehensive and reflect the body's work as a single entity. For example, the axis of ordinates can reflect the level of information exchange between different organs and systems and the autonomic nervous system. When there is optimal sympathetic-parasympathetic balance and active information processes, a continuous transmission of information from each organ to the autonomic nervous system takes place in the body and a systemic regulation is carried out throughout the whole body. When the information channels are blocked, this process is repressed or entirely cut off.

When there is a lapse in physiological parameters away from the normal level, a displacement takes place in the homeostasis level. At some point, an accumulation of unfavourable factors provokes a non-linear effect, and the body suddenly jumps to another homeostasis zone. The person gets tired quickly, sleep is restless and does not allow the person to recuperate fully, and the impact of viruses in the body leads to diseases. However when this occurs the person is still considered apparently healthy. The physiological parameters are close to the borders of the zone's norm, which in traditional medicine is categorized as an apparently healthy condition. The person can remain in that state for an unlimited length of time, especially if non-specific therapies and periodic rest are maintained. Genetic predisposition is an important factor for determining resistance of systems to non-optimal function.

In additional variations, many people have pathologic lapses in their health, which may be compensated by the body, but which inevitably have an influence on the overall function.

Finally, while continuing to function in a mode of load and stress, or where unfavorable factors are permanent in effect (chemical contamination from food, water and air, nervous-psychological load, being overweight, etc.) the compensating possibilities of the body may be insufficient, and it moves with a

sudden change to the next, pathologic, homeostasis zone. As a rule, this zone is linked to organic abnormalities and dysfunctions.

> *Therefore, it is possible to speak of the existence of several conditional zones of homeostasis, within the limits of which the person's body functions. A transition between zones is carried out as a result of sudden changes, but inside every zone there is a discontinuous set of quasi-continuous levels. The transition between them requires very little energy expenditure.*

At a high level of homeostasis, the sympathetic-parasympathetic balance is optimal and close to 100%, the level of entropy is close to the minimum for a given age, which corresponds to the maximum production of negative entropy by the body. **Let us call this functional homeostasis zone with the letter H, for Health**. This is the zone of optimal functioning for a given age, although within its limits a constant fluctuation occurs at a level of homeostasis.

Fluctuations of the sympathetic-parasympathetic balance take place during the functioning process, leading to a discharge of supplementary energy when the balance is diminished, and energy expenditure as the balance is restored. In other words, the downward motion along the axis of ordinates does not require supplemental energy, whereas upward motion requires an expense of energy, causing an increase in entropy, and this can only be compensated at the expense of an exchange of energies and entropies with the environment.

A classic example is the stress reaction of Selye. According to Selye, any sufficiently strong external stimulus (stressor), physical or psychological, provokes a condition of stress, which appears in the set, non-specific response (i.e. irrespective of the nature of the stressor) in the mammal body. He called this the ***overall adaptation syndrome – OAS.*** OAS is the totality of the defense mechanisms of the human or animal body under stress (mainly with the endocrine system). Three different stages make up the adaptation syndrome: **alert** (mobilization of defense mechanisms), **resistance** (adaptation to a difficult situation), **exhaustion** (intense stress of long duration, which can cause death).

The concept of stress is wider than the **adaptation syndrome** which can be sometimes viewed as a clinical manifestation of stress; so in people with abnormal

function of the endocrine glands, (and rats with removed adrenal glands), stress is possible without the **adaptation syndrome**. The basic mechanisms of stress are hormonal. The main morphologic sign of the formation of the **adaptation syndrome** is the so-called 'classic triad': enlargement of the adrenal cortex, reduction of the thymus and stomach ulceration. Selye also described the local adaptation syndrome (inflammation, for instance) arising in organs and tissues in response to strong or destructive stimulation.

Thus, the **adaptation syndrome** arises in response to the stressor, i.e. the factor causing the abnormality (or the threat of abnormality) of the balance of the body's physiological systems, i.e. the relative constancy of its internal environment, or homeostasis.

In the state of **alert**, all the physiological processes are activated, which means it is possible to view stress as a positive process which helps to mobilize internal resources to find a successful solution to the problems which arise. A shift upward takes place at homeostasis levels, which does requires extra resources from the body. When these resources are lacking in the problem-solving process, or when there are negative emotions, the stage of **exhaustion** develops, leading to abnormalities of autonomic control and a transition to lower homeostasis levels.

When the process of entropy compensation cannot cope with the production of entropy by the body, an uneven transition takes place to a lower adaptation zone which can be designated as **HS (Health + Stress).** In this condition, a quasi-stable level of autonomic control sets in, which is not optimal and accordingly requires higher energy expenditure with high entropy production. At this adaptation level, the person is considered apparently healthy; however, the state of health is unstable: the immune system does not work effectively and the person is prone to infections and tires quickly. Digestion is sluggish and the excretion systems enter a state of flux.

On the Bio-grams , the **HS homeostasis levels** are characterized by energy deficit conditions without filter, and by good energy with filter. This is most pronounced in the EPI diagram where the curve without filter remains in the inner area, while the curve with filter is near the lower limits of the optimal middle zone. Another important sign is the asymmetry in the right and left hands. As a rule, increased dispersion of the parameters of the EPI diagram for different systems and organs

can also be observed. This is shown by the high values of the RMS indicators, expressed in the Bio-grams in brackets.

One particular example of the HS homeostasis zone is elderly people with a string of chronic illnesses compensated at the autonomic level, which allows them to function relatively normally when energy expenditure is minimal.

When total loss of autonomic control occurs, the body unevenly moves to a **homeostatic pathology zone P.** Here, as a rule, a critical process develops. In the early stages it might not have pronounced symptoms. A specific example of this is the condition of cancer patients in the early stages of development of the illness, when there are no external signs that a pathologic process is developing actively. As will be shown below, the EPI-graphy makes it possible to detect characteristic signs of these conditions, linked both to the energy level and its form of organization.

The **ASC homeostasis zone** is linked to the **Altered States of Consciousness (ASC).** The whole body changes the character of the energy provision and switches over to a special mode in which a whole set of specific effects may appear. Above all this is evident in the characteristic activity of the brain's network of neurons, and in the specific character of both internal sensations and external signs.

These conditions are also linked to a specific type of EPI images.

> *The concept of the homeostasis zones and their EPI bioelectrography correlates is key when carrying out EPI analysis. Complete mastery of these concepts means it is possible to analyze the patient's condition and, in many cases, provide a prognosis of its development.*

Particular features of EPI data for different homeostasis levels

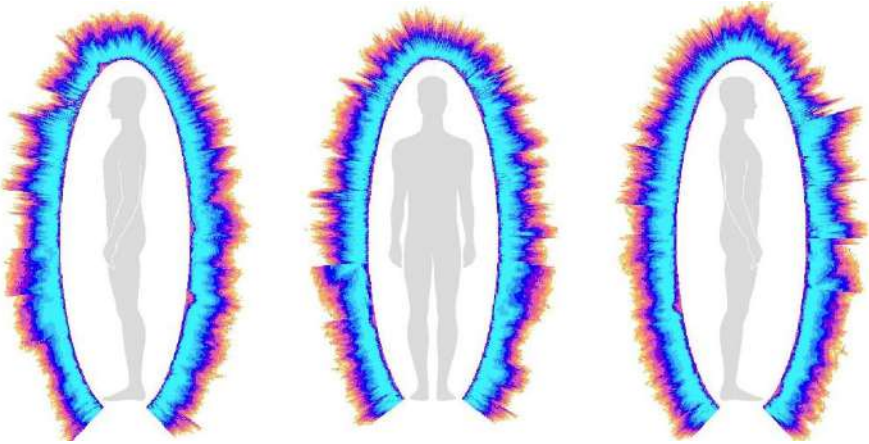
H (Health) homeostasis zone

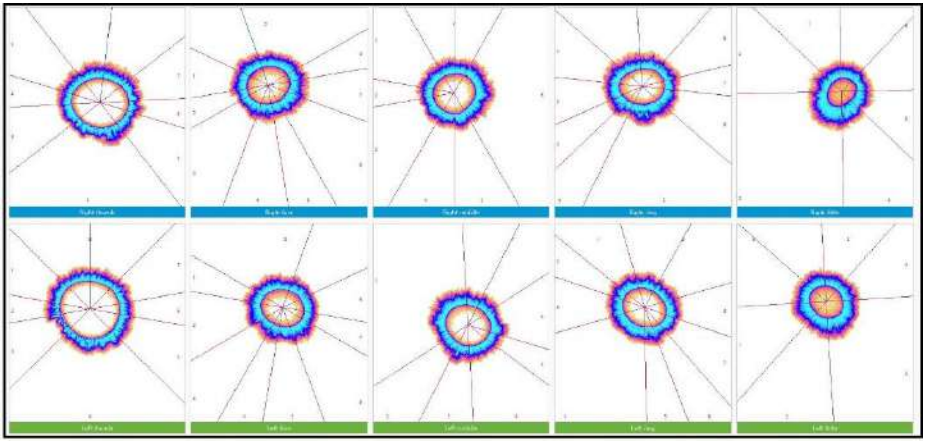
In Bio-grams the H homeostasis zone is characterized by a high general energy level. Bio-grams without filter are equal, powerful and without particular defects, Bio-grams with filter are even. On the EPI diagram both curves are situated in an optimal zone close to each other. There is a high degree of symmetry, the dispersion of the parameters for different systems and organs is small, that is, the line of the EPI-diagram is close to the circumference. Separate sectors with energy deficit may appear for one hand only. They are functional in character and disappear after a while.

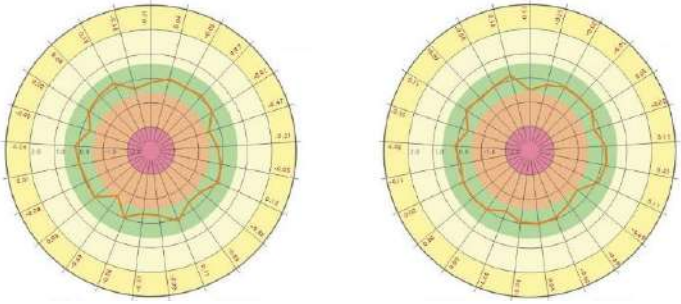
The H homeostasis zone is optimal for vital functions: "the person is full of strength and energy, thinks clearly, is vivacious, active, strong, sleeps well and wakes without difficulty. Such a person entirely corresponds to his psychological character and age."

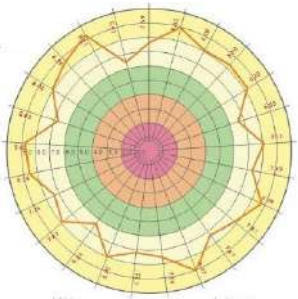
Example H 1, Man 47 years, practically healthy

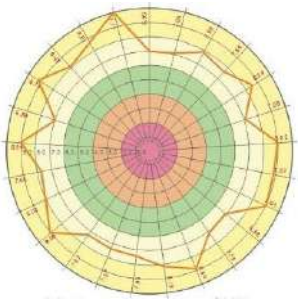
This person is healthy, but in the course of his life he had some health problems and had to use both conventional and integrative medicine. He works hard, eats healthy food, and from time to time has a drink with friends. Typically his condition is very well: energy field is strong, parameters are in most favorable zone, Energy Diagram is stronge than Health Diagram, BIO-grams look like perfect rings. However, if compare parameters during a yerar, we see month-to-month variations, which somehow correlate with the biorythmes (in particular, energy changed from 49.18 to 89.45). This shows, that measuring parameters on the regular basis, it is possible to see real everyday condition and organize activity accordingly: regulate loads and relaxation, spend more time at nature, make excercises and meditaitons.

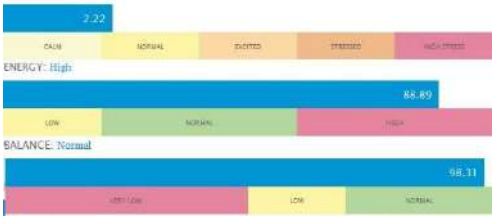


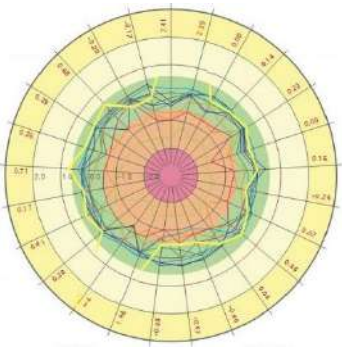


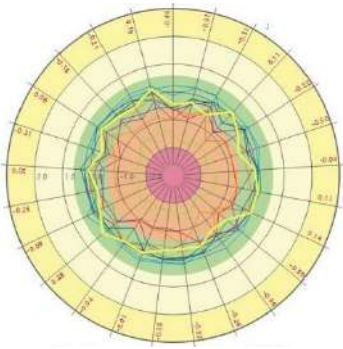


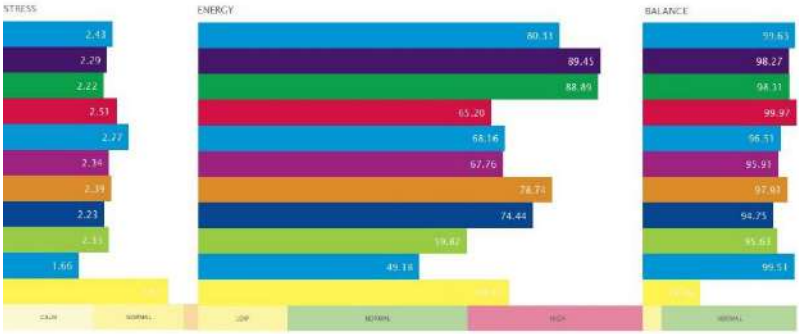





STRESS: Normal
2.22
ENERGY: High
88.89
BALANCE: Normal
98.31






STRESS
2.43
2.29
2.22
2.51
2.27
2.34
2.39
2.23
2.33
1.66
ENERGY
80.31
89.45
88.89
65.20
68.16
67.76
78.70
74.44
49.18
BALANCE
99.63
98.27
98.31
99.97
96.51
95.91
97.93
94.75
95.63
99.51

HS (Health + Stress) homeostasis zone

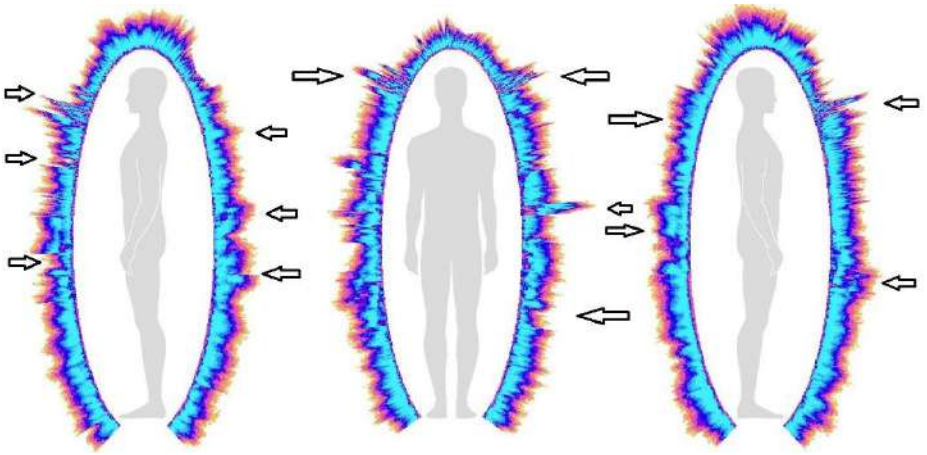
The HS homeostasis zone is characterized by the presence of energy deficit zones on the Bio-grams without Filter and reasonably dense compact images with Filter. The activation level is higher than optimal, but lower than the stress level, within the limits A = 3-6.

Another sign of the HS homeostasis zone is the inconstancy in time of Bio-grams without filter. Taking them on different days, or even during one day, we can observe significant fluctuations of parameters of the Bio-grams in a number of cases, and a full change of their aspect.

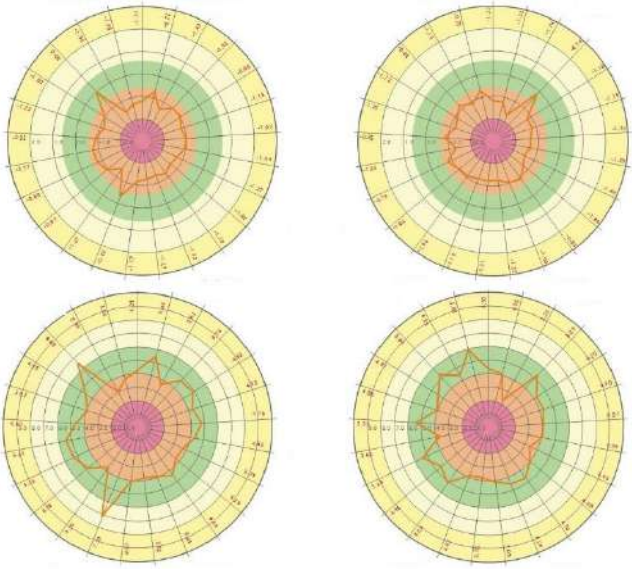
This is a manifestation of instability of the autonomic control and the abrupt reaction of the body to changes in external conditions. As a whole, the HS homeostasis zone is characteristic for most of apparently healthy people. Bio-grams are generally very convenient for analysis and allow not only to detect weak zones of the autonomic control but also to make a prognosis of the condition. This is quite a typical case for the work of doctors practicing holistic medicine. A low level of the autonomic control leads to autonomic imbalance, manifested in the so called 'vegetosis.' These concepts are being actively developed in modern medicine.

In accordance with Bio-grams of the H and HS homeostasis zones, it is possible to analyze the energy condition, or in other words, the level of the autonomic control of different systems and organs in conformity with the EPI diagnostic table. In the lower subtotals of the HS zone homeostasis this becomes impossible, that is, the autonomic imbalance is too strong. However, it is then possible to analyze the level of energy reserves in the Bio-grams with filter.

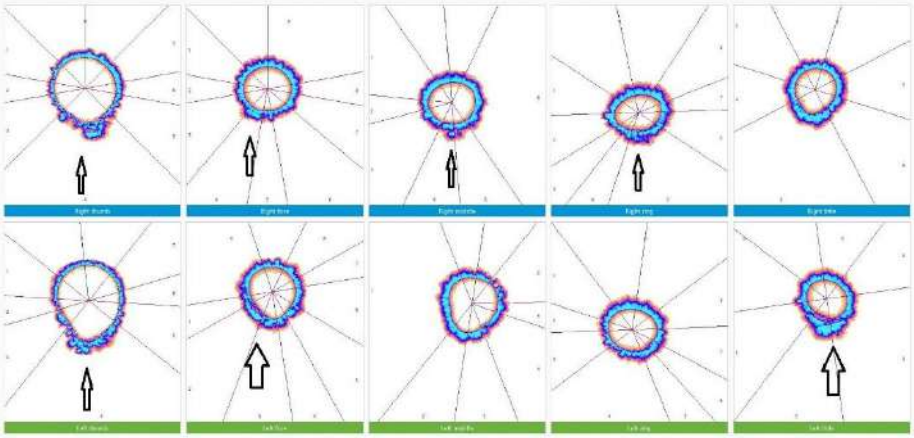
Example HS-1, Man, 51 years old, apparently healthy.
This is typical example of a person, having some health issues. His Energy Field is quite strong, but have defects we pay attention to.



His Health Diagram is mostly in deficiency zone, but Energy Diagram is stronge compared with the Health Diagram, which indicates that he has good energy potential.



Energy condition of different organs and systems we may analyse from the Biograms of fingers.



We pay attention to throat / thoroid gland area at 1R, 1L; sacrum and coccix zones at 2R; colon system at 2L related to respiratory system at 5L; liver zone at 3R; uro-genital zone at 4R. All these zones correlate with problems this person has. At the same time, his energy level is normal 52.87 J, and stress level is 3.12 so we consider him as apparently healthy.

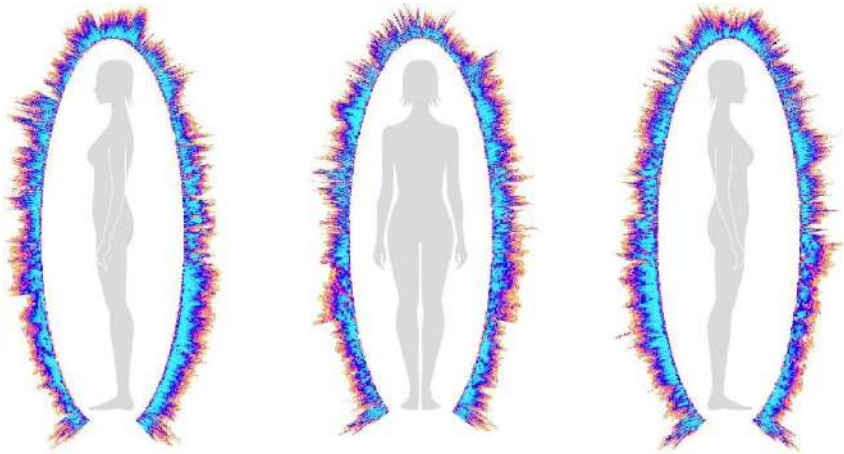
Example HS-2 woman, 64

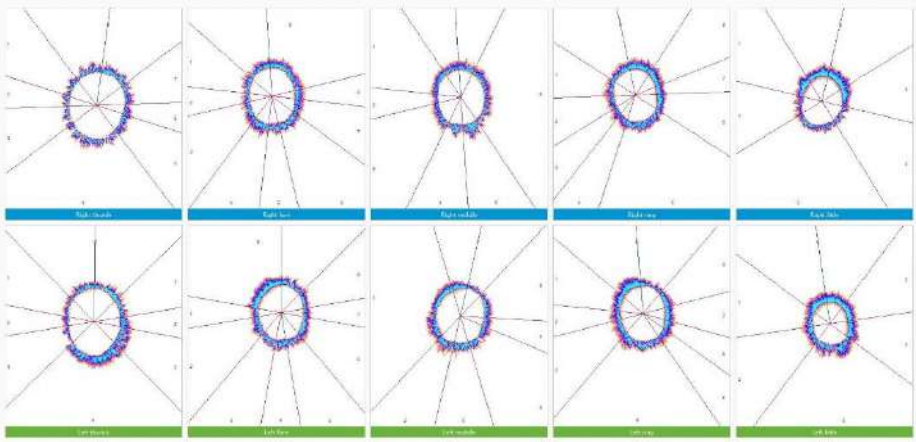
Clinically this woman is apparently healthy, although she is overweight. Not having particular health complaints, at the same time she periodically experiences autonomic discomfort: unpleasant sensations on the back, constipation, gases, bad sleep, migraines, etc. We can confidently affirm that if not corrected properly, the physiological condition of this woman will deteriorate.

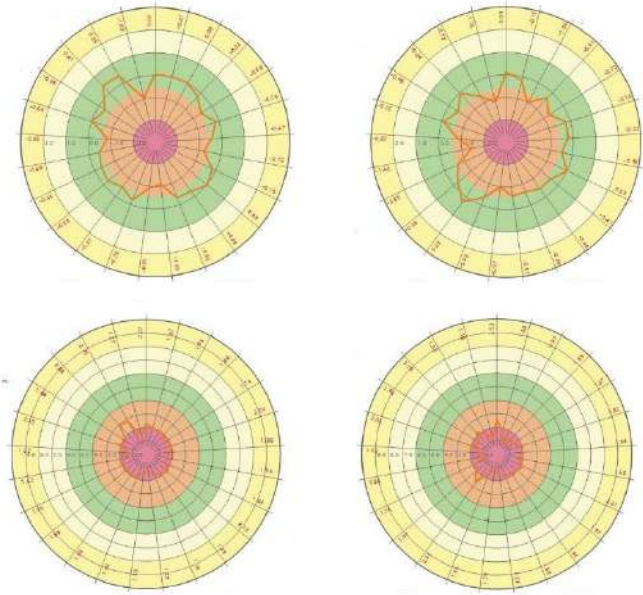
As we see, her Energy Field is quite low and energy level is only 27.6 J – below normal range, although Stress leve is normal – 3.36. At the fingers we do not see any specific marks, but Health Diagram is much stronger compared with Energy Diagram. This is an indication of a weak energy reserve.

Such people can have an array of chronic illnesses, and conventional curative medicine is almost unable to cope with a similar situation, and these patients go from one specialist to another. Life is somewhat listless and wages are spent on pills and tablets.

Furthermore, it can go as far as obvious symptoms or organic lapses, and the person could spend the whole of her life in the HS homeostasis zone, with no idea of how inefficiently his body is working. As a rule, the functional condition has an effect on the psychological: people in the HS homeostasis zone have to pay more attention to their health, which uses up a lot of emotional energy.







BIO-grams without filter reflect the basic weak zones of the body, or the risk zones. At high adaptation levels the systems and organs work together, with high energy, and energy deficit zones are not visible. When the adaptation level decreases, due to fatigue, stress or overload, the energy deficit zones are identifiable. They reflect the 'weak links' in the body. These are the zones in need of closest attention, since they are significant in terms of prognosis.

When it is frequently said that the GDV/EPI method makes it possible to detect illnesses in the early stages of development, that means this precise feature. From the autonomic point of view, different systems have different **levels of functional tension** which can be seen in their reaction to stress.

> *The stronger the level of functional tension of the system, the more active the reaction to stress will be, and the more pronounced it will be on the BIO-grams without filter.*

If the system stays under functional autonomic load for a prolonged period, there is a high probability that pathological organic processes will develop.

The detection of the 'risk zones,' together with prophylactic and preventive measures makes it possible to maintain the system in a condition of high energy and efficiency, i.e. to maintain excellent health.

It should also be borne in mind that **psycho-emotional tension** is no less significant for the body than the influence of the external environment. The emotions have a direct influence on the ANS through the CNS, and ANS reactions are reflected on the Bio-grams without filter. Later, we will look in more detail at the issue of researching the psychological state of the person using the EPI method. In most real-life cases, it is impossible to isolate the influence of a particular factor, and this can only be done within a specially organized experiment. In real life **we observe the systemic reaction of the autonomic nervous system to the impact of factors in the surrounding environment as well as psycho-emotional fluctuations.**

Let us observe a set of EPI data for cases of **cholelithiasis** in the HS homeostasis zone. The clinical cases observed below were helpfully presented by D.M. Shirokov, Ph.D., M.D. and E.U. Strukov, Ph.D.,M.D. (Military Medical Academy, St Petersburg).

Cholelithiasis, *(from the Greek* chole *– bile, and* lithos *– stone) is a human disease which is characterized by the formation of stones in the gallbladder and, more rarely, in the bile duct. By composition we can distinguish homogeneous (i.e. either cholesteric, pigmentary, calcareous, or albuminous) and mixed stones. The number of stones, their weight and shape vary widely. Gallstones form when the main constituent parts of the bile are deposited and become crystallized, which is determined by damage to the stability of the colloidal system which is the bile. A more frequent formation of choleiths happens as a result of damage to the metabolism, through genetic predisposition and particular food habits (rich foods and those high in cholesterol). Quite often, cholelithiasis is combined with other metabolic diseases (obesity, gout, pancreatic diabetes, familial hypercholesteremia, etc.). The course which cholelithiasis takes depends on the additional presence of infections, the intensity and the length of the obstruction (obturation) of the biliary tracts, as well as damage to the liver, pancreas, heart, etc.*

Cholelithiasis is a systemic disease with a complicated set of generative causes, affecting several functional systems of the body. At the same time it is usually not life-threatening. By indications, a relatively simple surgical operation is carried out, generally laparoscopic, and afterwards the condition of the patients improve and they return to normal life.

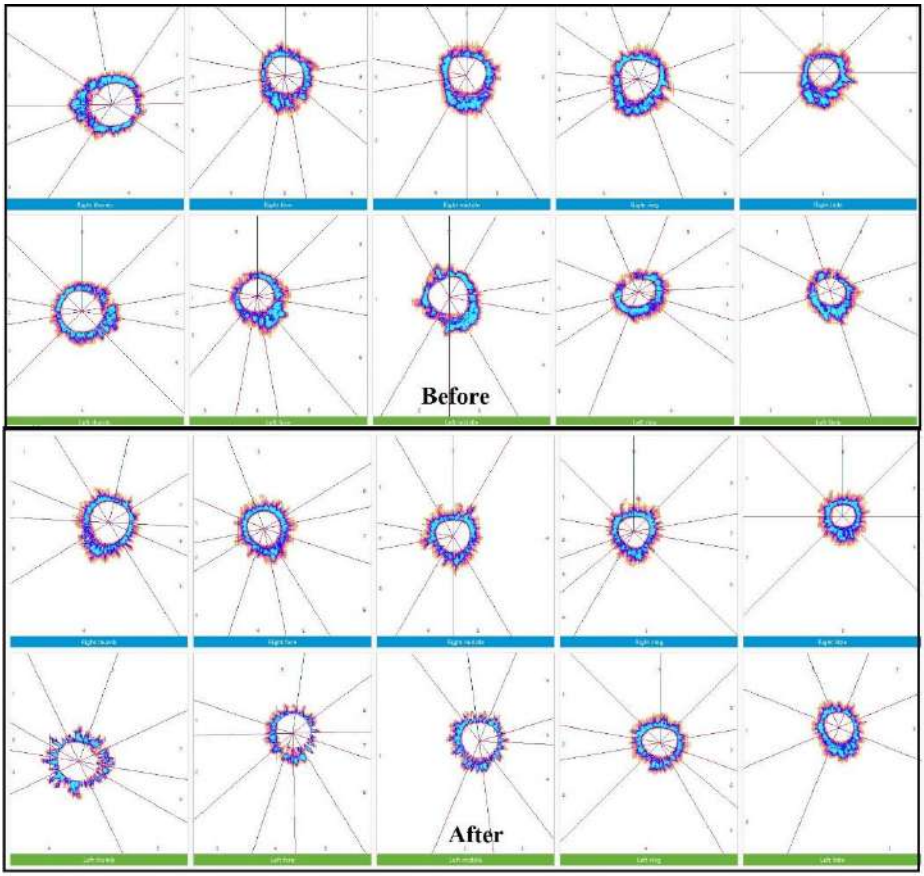
Let us observe several cases of cholelithiasis with Bio-grams before and after the operation.

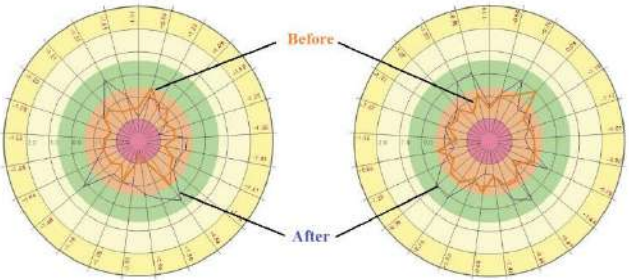
Example HS 3. Woman, 54 years old.

The initial condition before the operation shows on the BIO-grams an energy deficit condition in a number of systems, especially in the right hand. During cholelithiasis we look first of all to the lower sectors of fingers 2 and 3, because the area of inflammation is in this zone. BIO-grams in the initial condition are distinguished by their strong heterogeneity, . though some density is observed in the area of organs of the small pelvis. The Bio-grams may be considered as having aggressive signs. After surgery signs became much less aggressive, Energy Diagram moved to the positive zome, Energy coefficient increased. Stress level after surgery increased, which is quite understandable.

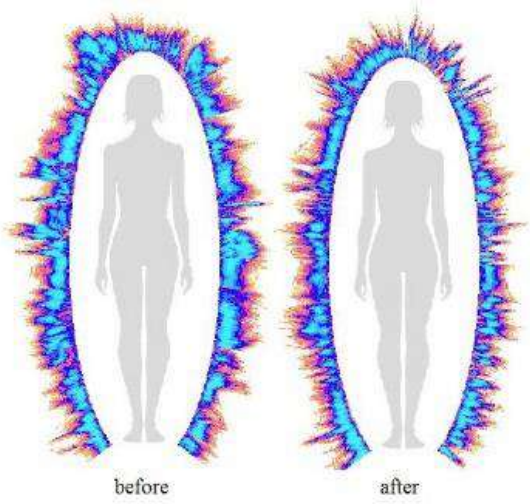
At the same time you may not notice these chenges at the images of Energy Field. This is an argument that you always need to take into account information from all the programs.

It is important to monitor the reaction of the body to the impact, in this case, of surgical operation. Immediately after the operation we can see an increase of the diagram in the right hand (brown curve), yet the day after, the R diagram returns almost to the initial state, while the L diagram actually decreases. This characterizes the overall activation reaction after operation with a return to the initial level after remission. **Clearly, the operation to eliminate gall stones from the gallbladder does not eliminate the causes of the disease.** Therefore, on the diagrams with filter, the process of bodily reaction to the operation is hardly reflected. It is important that in this case the operation performed was not highly traumatic.


Before
After

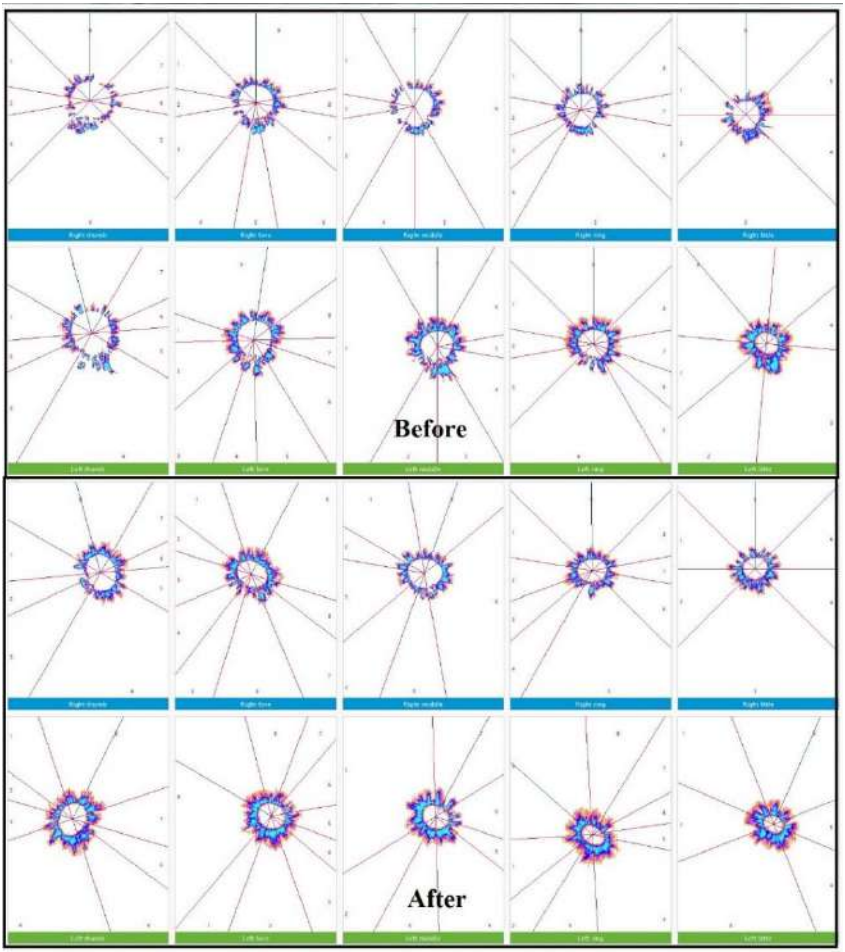

Before
After

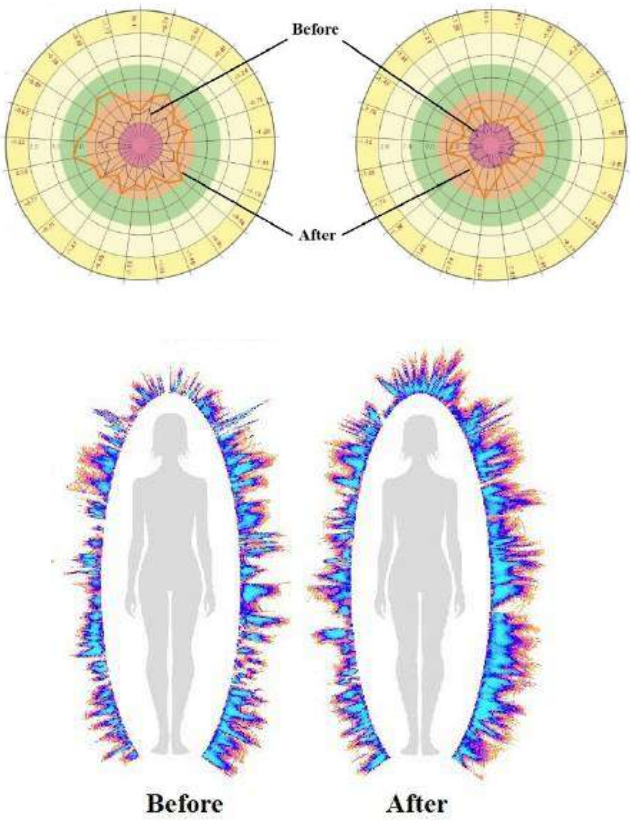
STRESS
3.60
4.37
CALM
NORMAL
EXCITED
ENERGY
25.05
28.50
LOW
NORMAL
Before
After
BALANCE
90.57
90.97
VERY LOW
LOW
NORMAL


before
after

Example HS 4 – Cholelithiasis, woman, 25 years old.

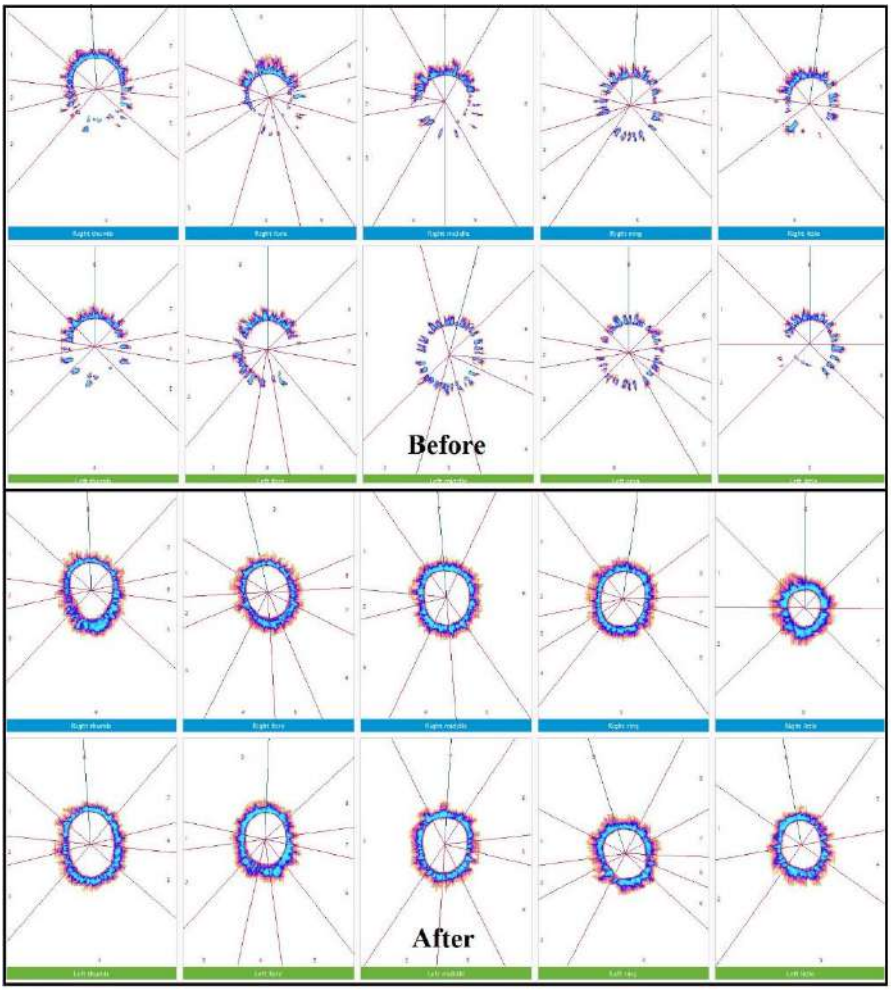
BIO-grams before the operation have intense emissions and heterogeneities in the area of lower sectors of the fingers 2 and 3. After the operation the intensity and heterogeneities in these sectors strongly decreases. At the same time on the Diagrams we can observe a clear reaction to surgical intervention, especially in the right hand. As with the preceding case, a dramatic increase is observed straight after the operation and a decrease on the following day (not shown on the graphs).



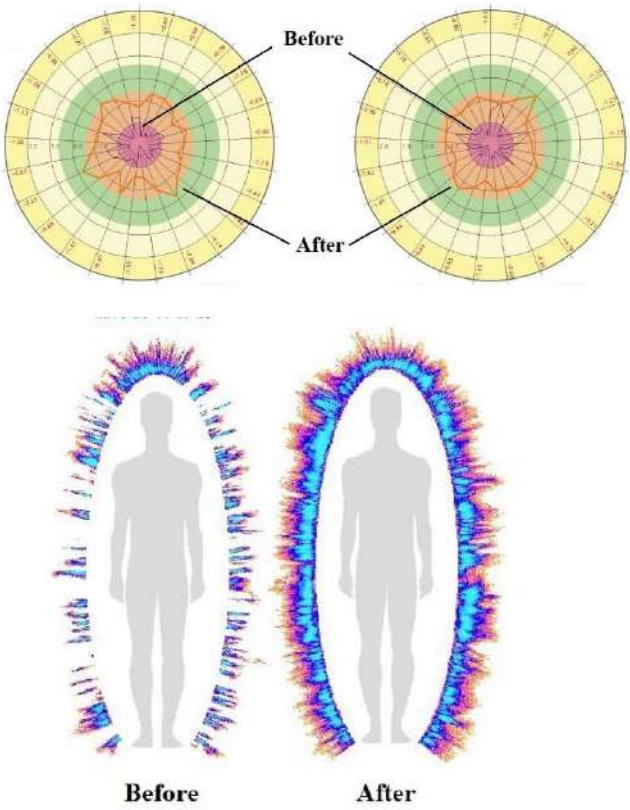


Example HS 5 – Cholelithiasis, man, 39 years old.

Initial EPI diagram of the energy deficit on both hands. On the initial BIO-grams there is a clear deficit in the lower sectors of all the fingers, with streamer defects on 2R and 3R. Similar defects in the lower sectors of 1R and 1L, 5R and 5L show the excited state of the endocrine system. At the same time, EPI F in the initial state are fairly even, this shows the lack of strong pathological organic disturbances immediately after the operation. improve dramatically, the defects shown remain. On the Energy diagrams there is a clear reaction by the body to the operation, showing the body's healthy protective mechanism and the presence of energy reserves.


Before
After

STRESS
Before
After
2.74
7.31
CALM
NORMAL
EXCITED
STRESSED
HIGH STRESS
ENERGY
BALANCE
34.27
21.00
99.70
95.83
LOW
NORMAL
NORMAL



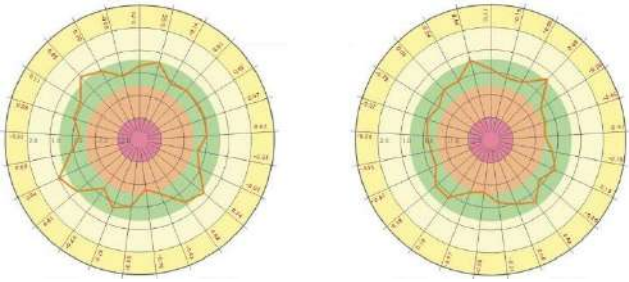
The use of examples again illustrates the idea that different Bio-Well programs carry different information. The *Energy Diagram* gives a representation of the overall energy of separate systems and the body in general, whilst reviewing the details of these processes requires the use of the BIO-grams of fingers. Bio-Well programs allows to analyze sectors relating to the systems in detail.

The cases reviewed here are typical for apparently healthy people who have undergone a change in their physiology and energy due to various factors, and are likewise typical of mild and moderately serious illnesses. Changes in parameters of the BIO-grams reflect the fluctuations of the functional condition and the energy of different systems and organs. The activation coefficient reflects the level of functional tension as well as the stress level. The therapy being carried

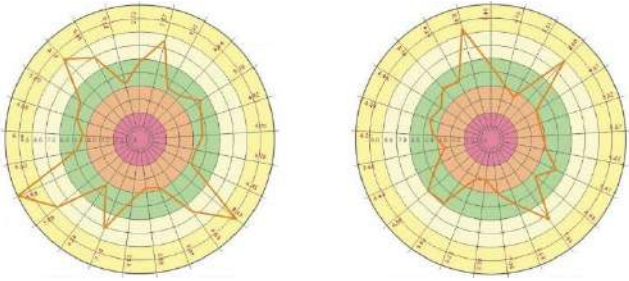
out leads to an improvement in the overall condition which is reflected on the BIO-grams.

Example HS 6, *woman 36 years, apparently healthy, but having many complains*

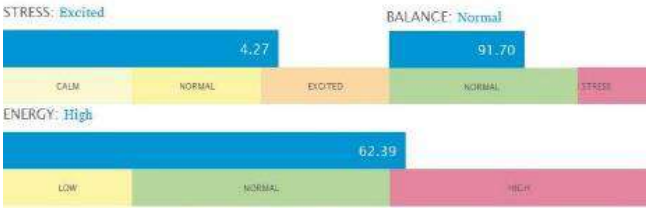
Health Diagram is in favorite zone and lower than the Energy Diagram, which is a good indication, but on the Energy Diagram we see strong ejections, which indicate hypo activity of the particular organs. Stress level higher than norm and balance is at the lower end of a norm level. On the Energy Field, we pay attention to sevral areas, for detailed analysis we switch to fingers BIO-grams.



Health Diagrams

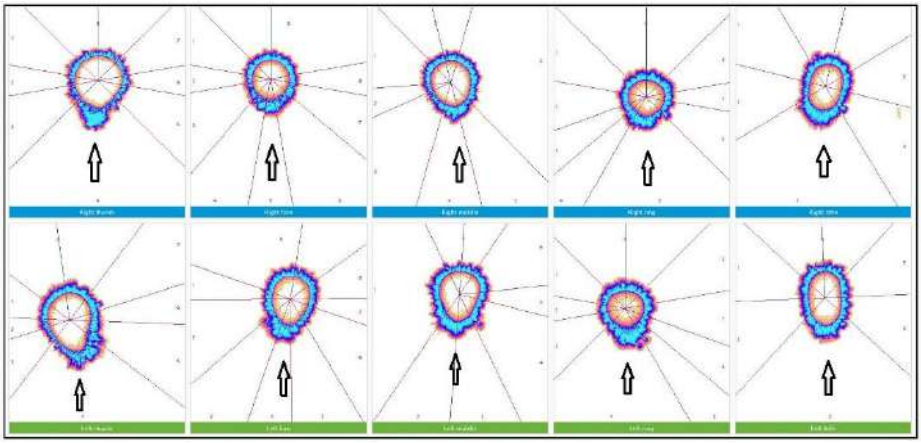


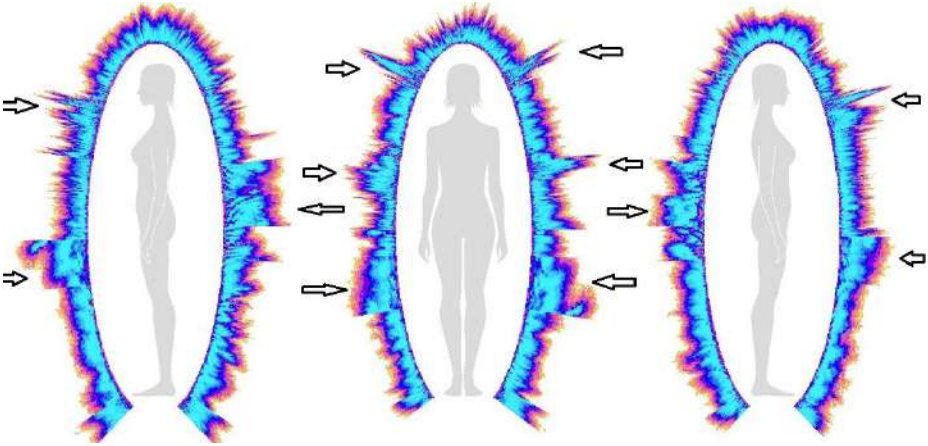
Energy Diagrams



We see unfovarable signs in the lower sectors of every finger. Together with the Energy Field, Energy Diagram and Balance programs, it allows us to define areas of attention:

- *Endocrine system, in particular, thyroid, mamary and adrenal glands;*
- *Spine, in particular, sacrum and coccix areas;*
- *Colons, in particular, sigmoid colon and rectum;*
- *Urino-genital system.*





We see complex of problems, accumulated in years. They are reflected in multiple symptoms: hypertension, diabetes of II type, constipations, irregular monthly circle, and spine pains. In cases like this classical medicine may offer variety of medications, without informing patient about possible side effects. Much better solution – to use integrative approach, pay attention to life style, relaxation, food, water regime, and regular check-up.

In cases like this, we discuss with a patient the overall situation, health complains, psychological situation. As a result, we may recommend person a list of necessary analysis and life style transformations. It was many cases when people were coming back in a year with gratitudes and their condition changed dramatically.

It should be borne in mind that in the HS zone of homeostasis, chronic illnesses may not show up on BIO-grams. This is linked to the phenomenon of **compensation,** when specific systems or organs compensate for the inefficient function of other systems. For example, in the case of the right kidney or right ovary being removed, the counterpart left organ takes on its physiological functions, and the BIO-gram shows a normal picture without visible defects.

At the same time, when burdened (by stress, unfavorable environmental conditions, bad water or food), compensatory possibilities are insufficient, and the BIO-grams show clear defects.

For people in the HS zone of homeostasis, timely monitoring of the condition is strongly advised.

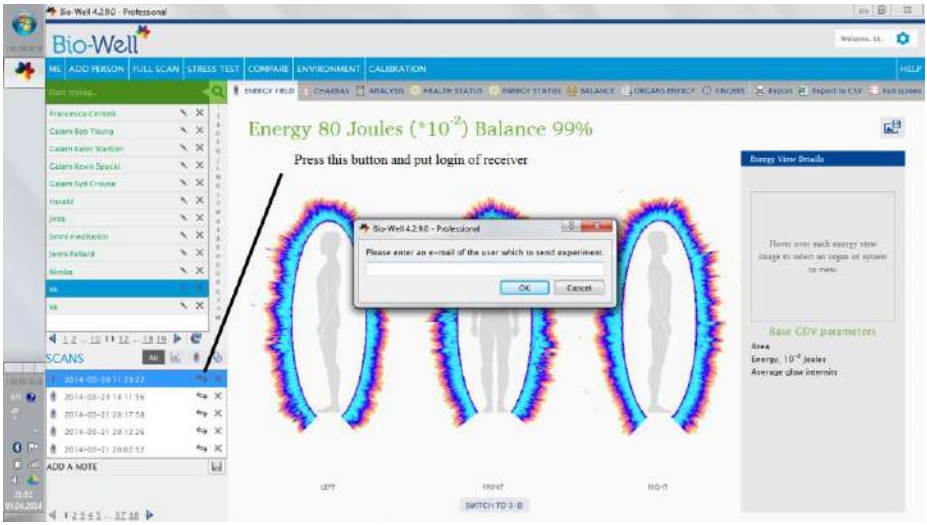
In the low levels of the HS homeostasis zone, the BIO-grams without filter hardly register any image, only individual sparklets (see case HS 5). The Bio-grams with filters, meanwhile, may look perfectly normal. This illustrates the strong imbalance of sympathetic and parasympathetic parts of the autonomic nervous system, which may be related to strong physiological stress.

> *NB:*
> *If you have obtained* BIO-grams *similar to Figures of case HS 5, which seem to be different from the usual, you must repeat the measurement, wiping the finger each time with a dry cloth and proceeding immediately to the capture. In this case, after each finger has been registered, it is necessary to wipe the optical lens of the device.*

The problem is that the GDV instrument do not give good images when there is heavy perspiration on the fingers. In a state of rest, this is one of the signs of autonomic imbalance, although such a scenario can also be observed in atheletes during training or in obese people after even gentle physical exercise. It goes without saying that these various situations should not be confused.

In the low levels of the HS homeostasis zone, characteristic 'palm-like' streamers can be observed. Their nature is evidently linked with the release of salt through the skin, although this has not been thoroughly studied. In the earlier Kirlian photography, diagnostic methods were developed which were based on the appearance of similar characteristic streamers [Milhomens, 1997] and their relation to illnesses. In EPI bioelectrography such a practice does not exist because we lack a database of such cases. We would be grateful to all of our colleagues in other countries if they would send such BIO-grams along with a detailed description of the patient and situation. This will allow us to create a database of characteristic streamers, and possibly draw some fresh conclusions.

In Bio-Well system this is very easy. You need to press one button (see below) and send it to login CASES. To check differnet BIO-grams collected at this account you need to use login and password CASES. This account allows to see all the information, but does not allow to take measurements.


Bio-Well
Energy 80 Joules (*10-2) Balance 99%
Press this button and put login of receiver
Please enter an e-mail of the user which to send experiment
OK
Cancel
SCANS
ADD A NOTE

Prolonged presence in the HS homeostasis zone under additional stress, both environmental and psychological, can lead to intermittent transition into the P homeostasis zone – i.e. to the loss of autonomic control.

P (Pathology) homeostasis zone

Transition to this level is related to staying for prolonged times in the low sublevels of the HS homeostasis zone, with a dramatic shift in the entropy of the body or under severe stress. Provoking factors, such as harmful chemical substances, carcinogens, radiation even in small doses and pathological micro organisms are constantly in effect. At some point the so-called 'bifurcation shift' takes place, and the body loses its autonomic regulation. The systems and organs basically work, each fulfilling its task, but without any tight overall control.

At first glance it appears that nothing unusual is happening. It could be compared to a high-level orchestra, whose conductor suddenly has to go and call home, and the orchestra rehearsal continues without his participation. Each one of the musicians knows his part perfectly and has the sheet music before him, but after about 15 minutes the viola player starts to discuss yesterday's football match and loses his place, and the second harpist decides that actually everything sounds perfectly all right without her and slips out on the quiet, rushing off to the hairdresser's before her evening date. A well-preened set, once it has lost its direction, gently slides into a state of chaos. You can see what it leads to in Fellini's *The Orchestra Rehearsal*.

It is the same in the human body. At first glance, everything continues to function, but within the system the source of danger is already increasing. A group of cells, when the body's control is removed, begins to grow and develop, and creates its own blood circulatory function; it constantly increases in size, thereby creating its own autonomous system within the body system. This process has no symptoms, and for a long time goes unnoticed by its host. When a tumour is detected, the group of cells has already reached an advanced stage of development. This is second or third stage oncology.

In a 'luckier' scenario, serious inflammation develops around the 'risk zone.' This might be a cancer, renal insufficiency, colitis or many other things. One of

the problems is slagging of vessels or arteriosclerosis, which leads to a whole array of cardiovascular illnesses.

Therefore, loss of autonomic regulation is the cause of the most serious illnesses.

In the BIO-grams the P homeostasis zone is reflected in a quite specific way. The BIO-grams without filter may have an almost ideal appearance. They become even and round. At first sight it is practically impossible to distinguish them from the Bio-grams of the H homeostasis zone. The EPI diagram without filter lies in the middle zone or higher and practically coincides with the EPI diagram with filter.

In some cases the EPI diagram without filter is bigger than EPI diagram with filter (see fig.3.5). This may be a troublesome indication!!!

How do the Bio-grams for the H and P homeostasis zones differ?

H homeostasis zone: Bio-grams with and without filter are the same in density and evenness. Any defects can be seen in the Bio-grams without a filter; with filter there are no defects and heterogeneity.

In the P homeostasis zone Bio-grams without filter may have a different appearance, while in Bio-grams with filter characteristic defects show up.

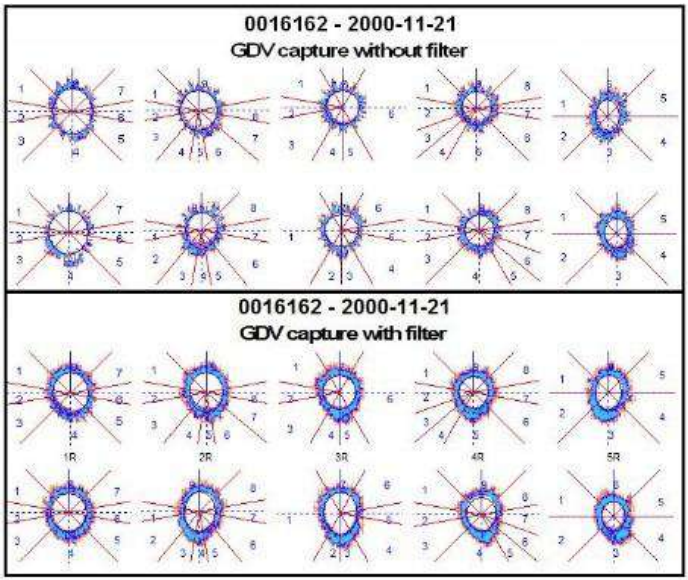
As a rule, they have a cloudy image, are 'spongy' in form and are situated in separate sectors. In this connection it may be that there is no link with the localization of the tumor or inflammation. This scenario is better illustrated by examples.

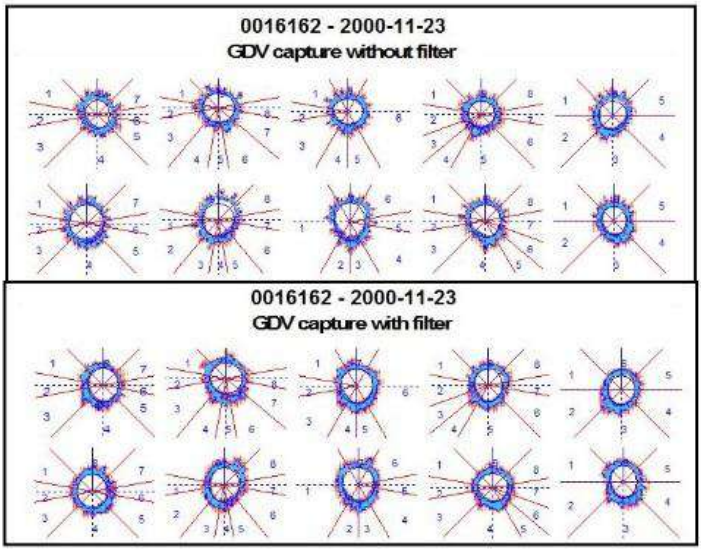
Example P 1 man, 45 years old, stomach cancer.

The initial Bio-grams without F (2000-11-21) consist of 'partial-continuous' emissions from all fingers. Bio-grams with F in the initial condition have 'cloudy', spongy defects in the lower sectors of fingers 2, 3, 4 and 5. Such signs are typical

of oncology patients and are characterized by the presence of specific defects in Bio-grams with F. For several days following the operation, a transformation can be noticed in the Bio-grams. In the Bio-grams of the fingers, an improvement in parameters can be noticed, appreciable both with and without filter, defects in the lower sectors remain, even though they are less pronounced.

The degree of severity of the illness on the ASA scale = 2, operation poorly tolerated, 6 days in intensive care, 17 days in clinic.





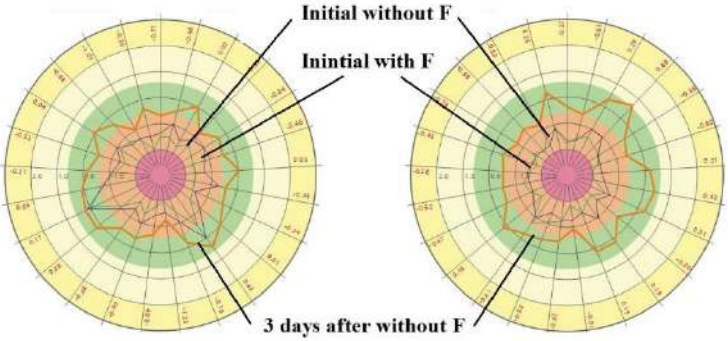
Let us remember that the EPI method reflects the body's level of autonomic regulation. Oncology patients are in the P homeostasis zone when that regulation has been all but destroyed, which shows up on the diagrams in the positive energy zone. Defects may appear both on *Bio-grams* without filter (wF) and most important, on *Bio-grams* with filter (F). They may, however, show up not only in the direct inflammation zone, but also in related zones. For this reason it is important to be extremely accurate during analysis of the P homeostasis zone in the organ sectoral analysis.

Example P 2, man, 73 years, stomach cancer.

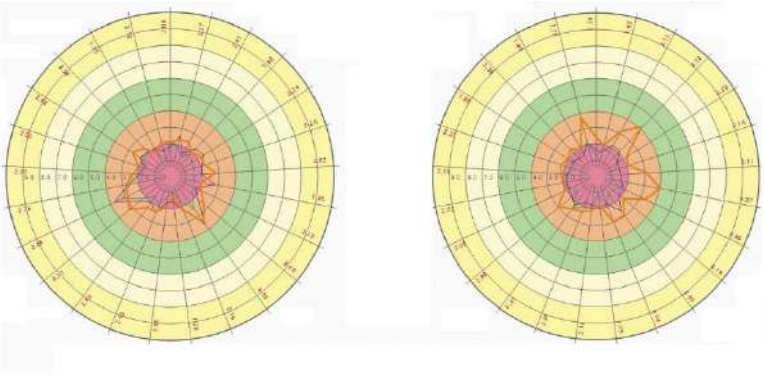
The Bio-grams without F in the initial condition are quite dense, clearly defined cloudy defects in the low sectors of 5L and 5R. As noted previously, when there is serious autonomic loss and oncology in particular, the low sectors more clearly show defects. A similar scenario can be seen in Bio-grams with F in the initial condition. The clearly cloudy emissions in 5R|2 are linked to the stomach; similar defects in 2R|4,5,6; 2L|3,4,5; 3L|2,3; 4L|3; 5L|3,4. All of these zones are to some extent linked to the gastrointestinal tract. After the operation Bio-grams without F assume the 'partial-continuous' character significant to us. This could be interpreted as the appearance of elements of the autonomic regulation in response to operational stress. Paradoxically, in this case, as is often the case

during corrective treatment, when the main cause of illness is removed (in this case a stomach tumor), the body switches on its autonomic regulation system, which can translate into an exacerbation of symptoms. We may see this both on Diagrams and on parameters. It is important to mention, that in this case Energy Diagrams were much lower compared with Health Diagrams. This is one more indication of the severity of this case.

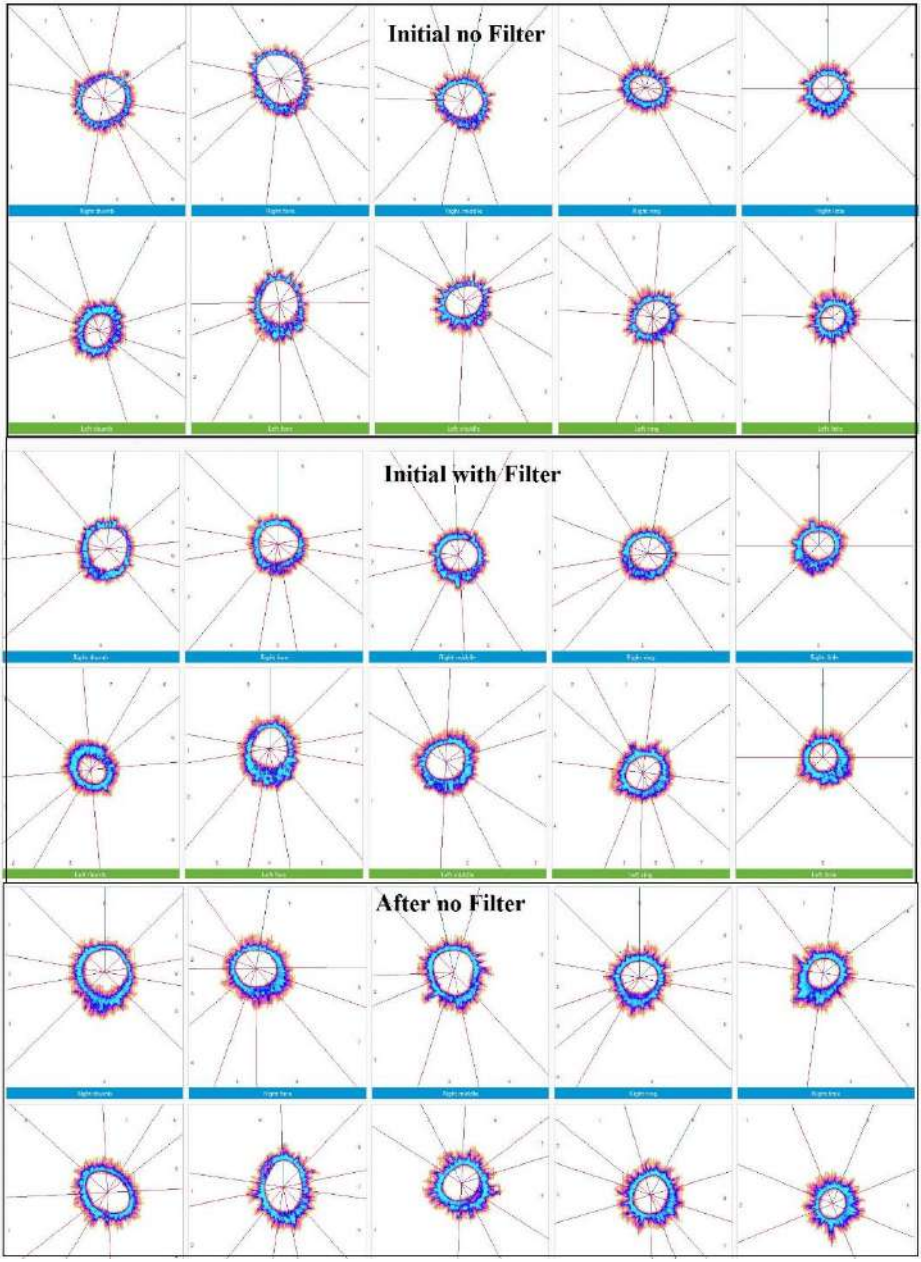
This patient's case was severe, the degree of severity of the condition on the ASA scale = 4, after the operation 2 days were spent in intensive care and 10 days in clinic. Bio-grams changes show how poorly the body tolerated surgical intervention.

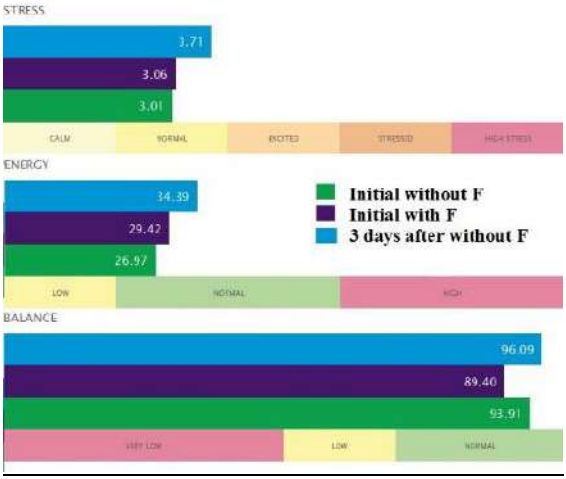


Health Diagram



Energy DIagram

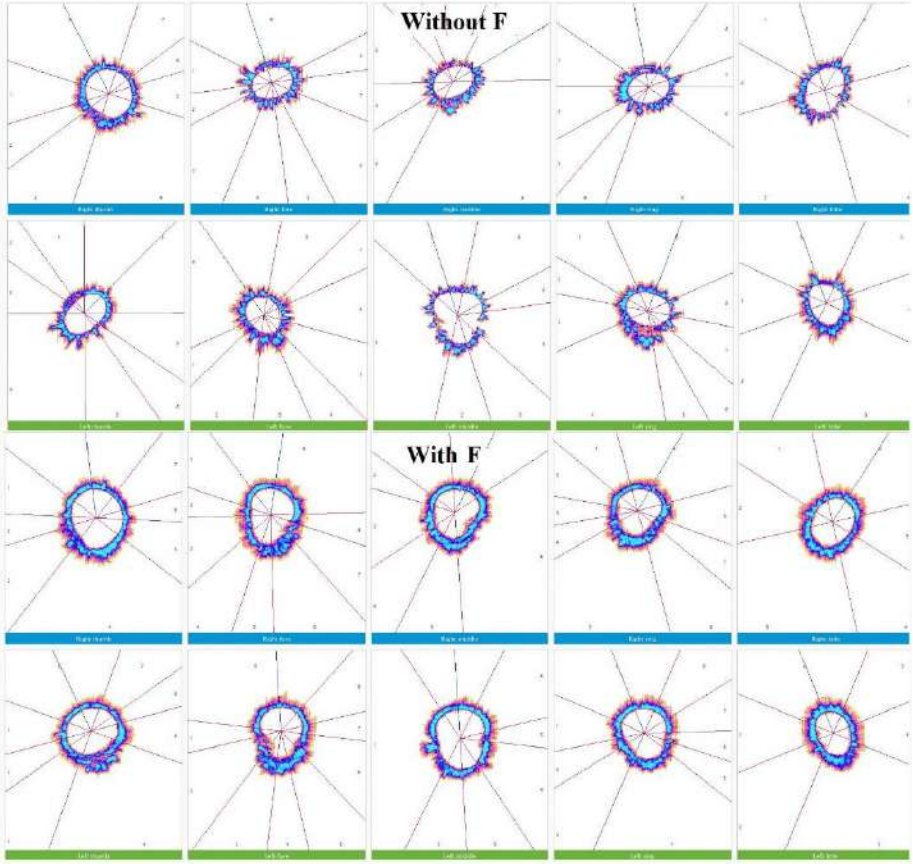

Initial no Filter
Initial with Filter
After no Filter

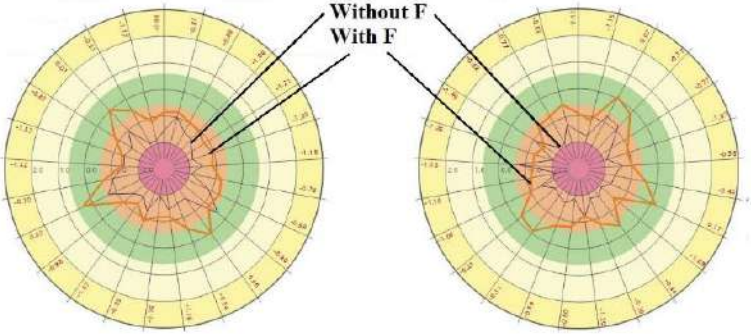


Example P 3, man, 73 years old, cancer of the colon.

The initial Bio-grams without F have the characteristic 'partial-continuous' appearance, Bio-grams with F have clearly apparent cloudy defects in sectors 2R\5,6; 2L\3,4,5,6; linked to the bowels. At the same time emissions and defects can be observed in 4R\5; 1L\4; 3L\1; 1L\7; 5L\3. This testifies to the general severity of the condition. Immediately after the operation Bio-grams acquired clearer defects in sectors 2L\3,4,5 and 4L\4. On the day following the operation Bio-grams defects were more clearly apparent, and 2L became energy deficient. Diagrams demonstrate energy deficiency, with Energy Diagrams being much lower compared with Health diagrams.

The patient died on the following day.


Without F
With F

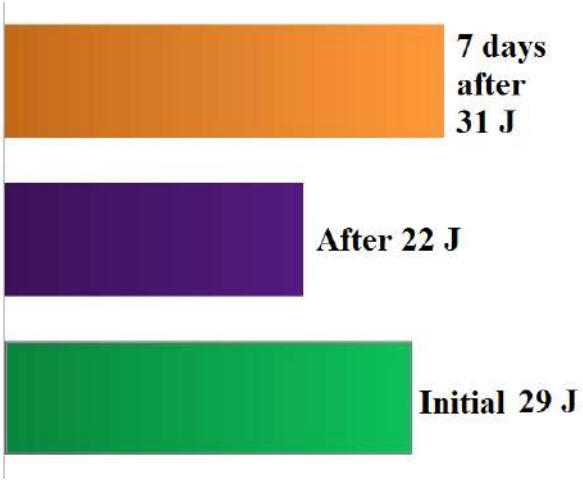

Without F
With F

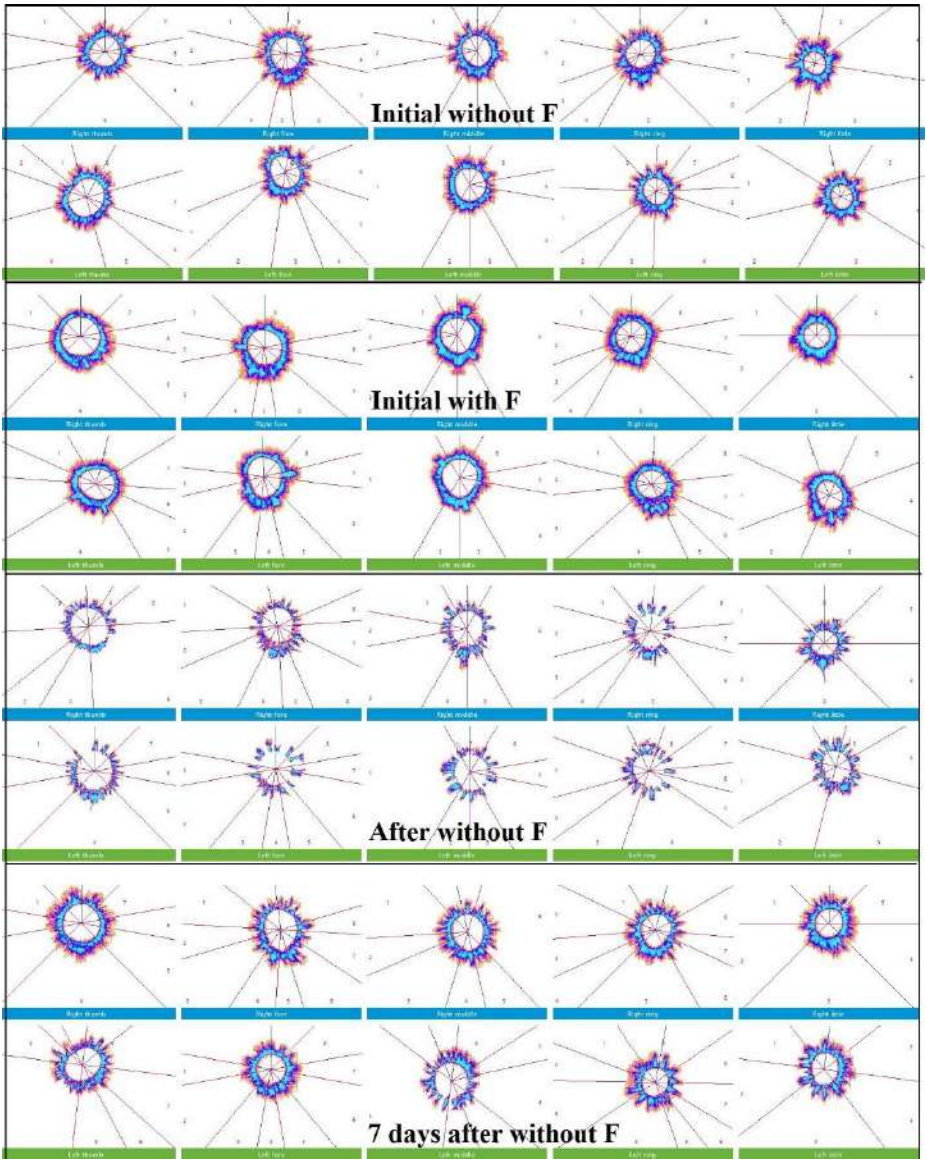
Example P4, woman, 62 years old, cancer of the rectum.

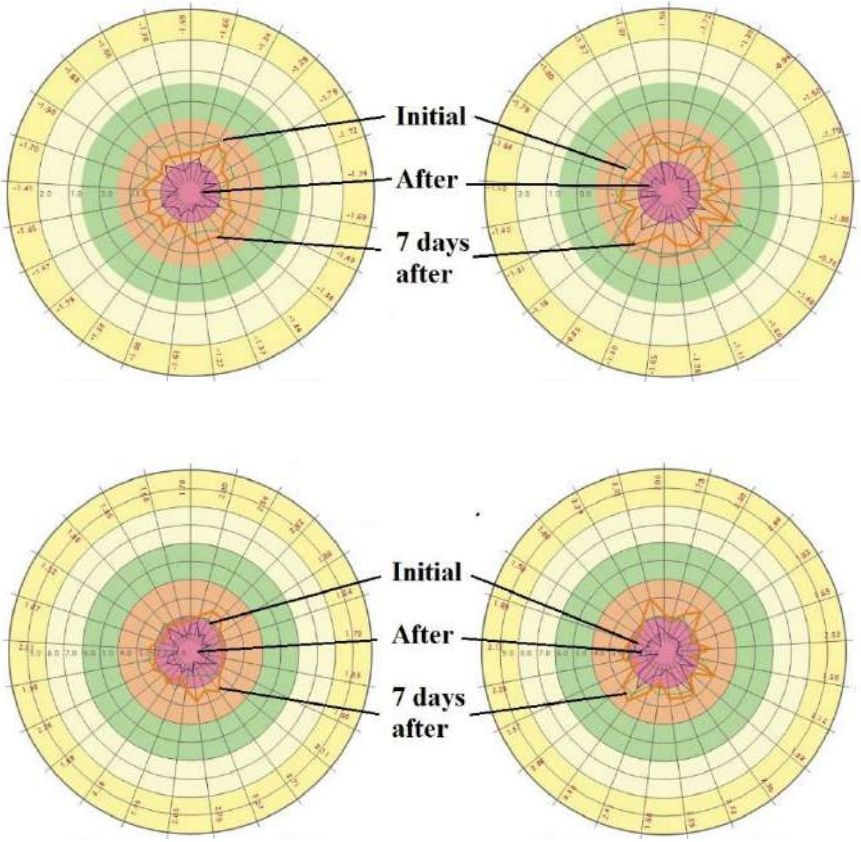
By the initial Bio-grams without F it is impossible to say something about the nature of the deceise, not ot mention cancer. In the rectum zone (2L|3) emission is observed which does not differ in nature from those in other sectors. On Bio-grams with F in lower sectors of all fingers the typical 'cloudy' spongy defects can be observed. Good indication is much less size of Energy Diagrams compared with the Health Diagrams.

Immediately after the operation character of BIO-grams practically does not change, but the Enegy decreased, which is a negative indication. As was shown in a big research project, when energy increases immediately after surgery, this is an indication of good reaction to the operational stress. 7 days after surgery Energy Diagram increasing slowly, which was a good sign.

The degree of severity of the illness on the ASA scale =3, the operation was poorly tolerated, 3 days in intensive care and 34 days in clinic.



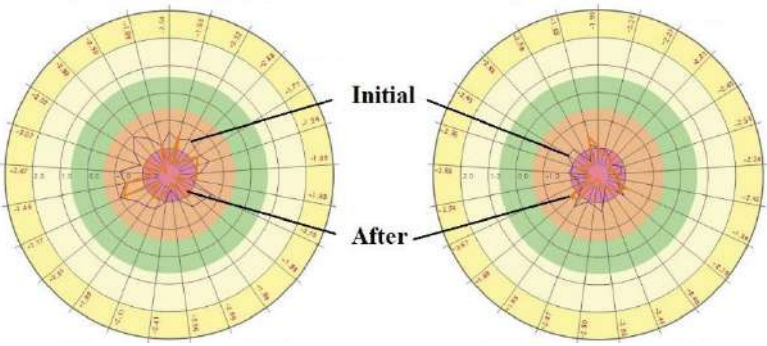

Initial without F
Initial with F
After without F
7 days after without F



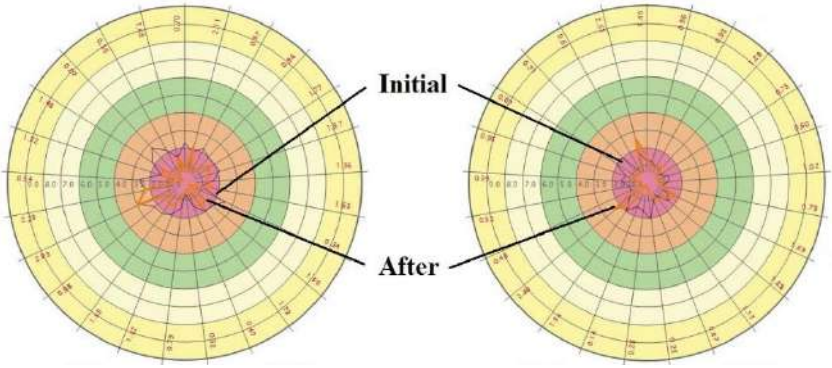
Example P 5, man, 24 years old, acute appendicitis.

The initial diagrams (green curve) are energy deficient, which distinguishes this case of a severe inflammation from a cancer case. The initial Energy Diagram was smaller that the Health Diagram, after the opearion parameters decreased, which is a negative indication. Initial BIO-grams without F have a clear defect in the zone of the lower sectors 2R and 2L. The example given clearly indicates that sector 2R\7 corresponds to the appendix, and in this case, this sector is relatively calm, but a defect is clearly apparent in the neighbouring sectors 2R\4, 5, 6. A similar scenario can be observed on BIO-grams with F with a clearly apparent defect in zones 2R, 2L. On the day following the operation these defects continue to appear as without F as well as with F.

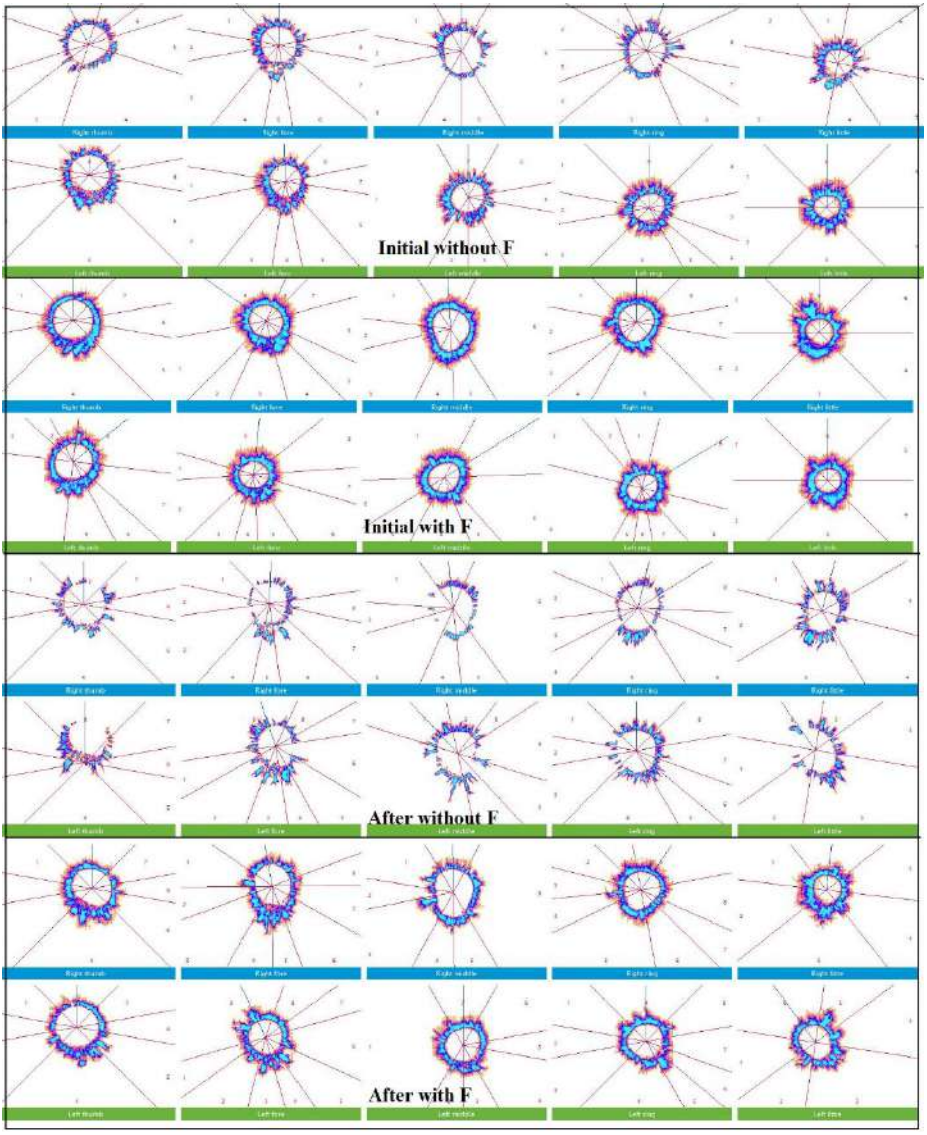
The operation was badly tolerated, 9 days in intensive care and 18 days in clinic.



Health Diagram



Energy Diagram


Initial without F
Initial with F
After without F
After with F

Example P 6, man, 73 years old, stomach cancer.

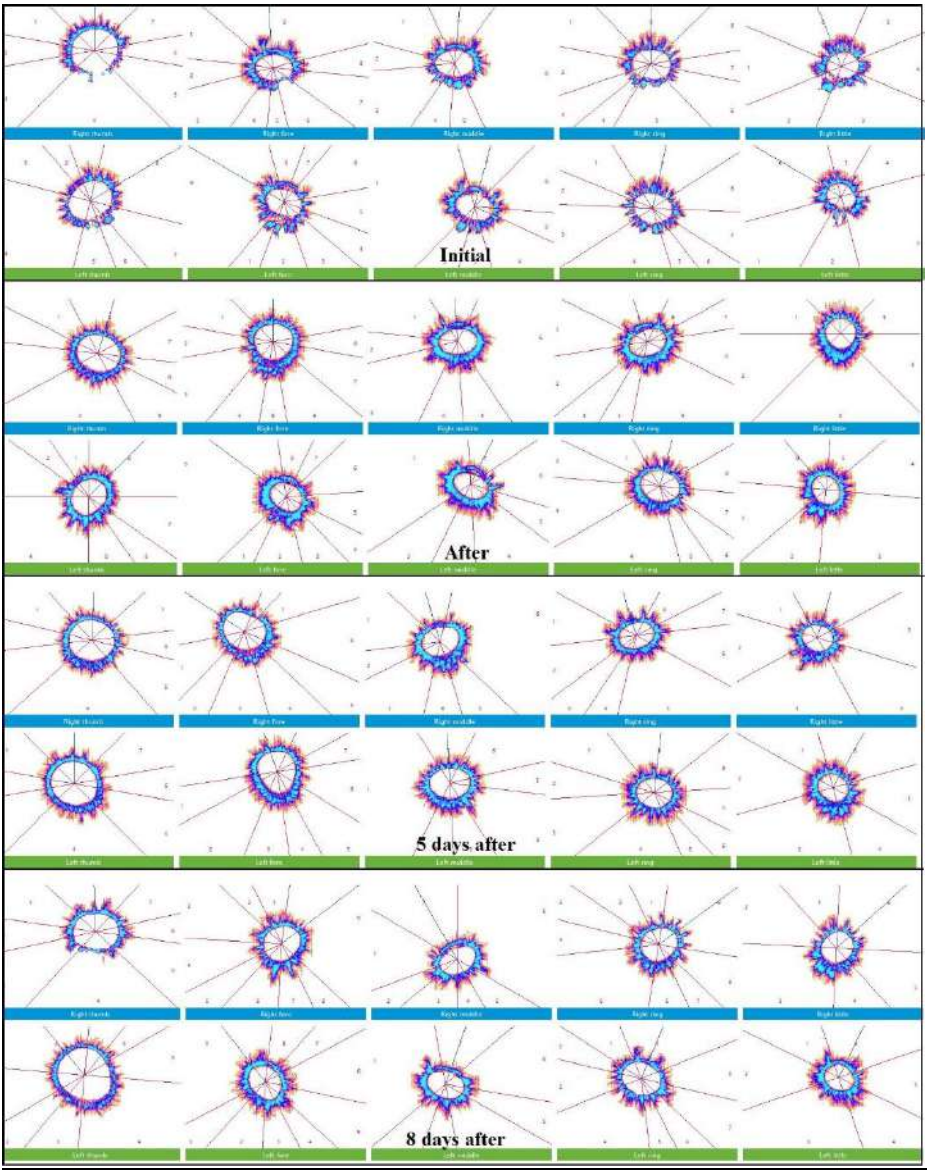
The initial BIO-grams without F have a typical partial-continuous appearance with apparent defects in the lower sectors. The same applies to BIO-grams with F. On the next day after the operation, the defects apparent on BIO-grams without F in sectors 3R, 4R, 2L intensified. The patient did not tolerate the operation well. On BIO-grams with F that day, the quantity of pathological defects decreased, however emissions appeared in other zones. On the 5th day BIO-grams became more even, although there were still defects in the lower sectors. On the fifth day the patient was in intensive care, emissions were still apparent on BIO-grams in sectors 5R|3 and 5L|3, which are linked to the respiratory system. On the eighth day in intensive care (the partial-continuous character of BIO-grams increased, with clear defects in all zones.

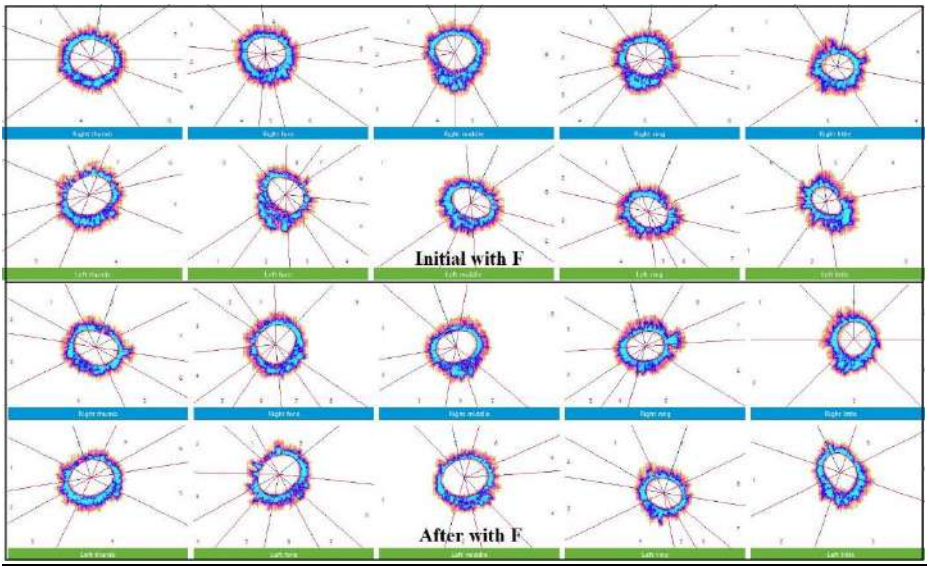
The Health Diagrams with out F were bigger than the corresponding Energy Diagrams, with little changes during these days, while on the Health Diagrams with F we can see increase after surgery.

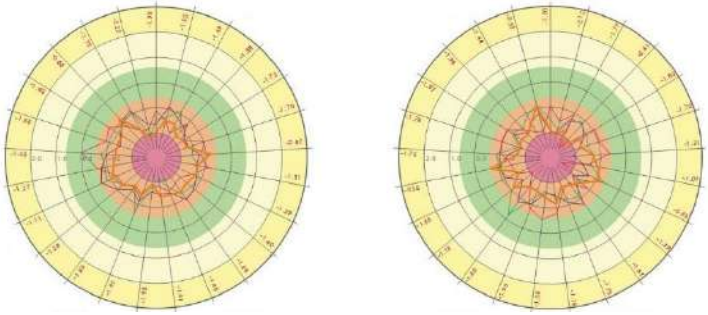
On the following day, the patient died of pneumonia.

From the above analysis it would be imposible to predict this outcome.

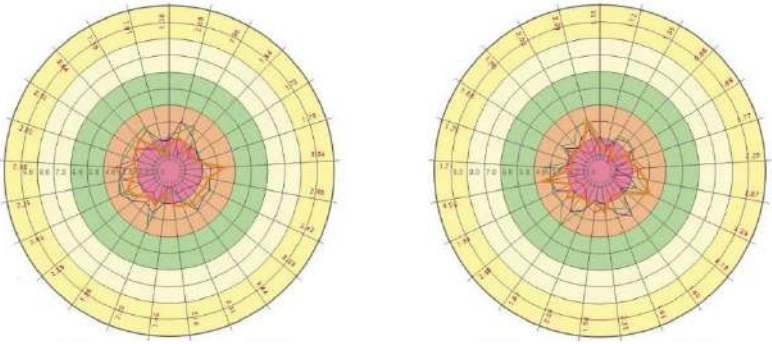
All of the studies of cancer cases involved a patient undergoing surgery with stage 3 or 4 cancer, i.e. when the autonomic control regulation was almost completely absent. Cancer patients in remission present a different EPI image.


Initial
After
5 days after
8 days after





Health Diagrams

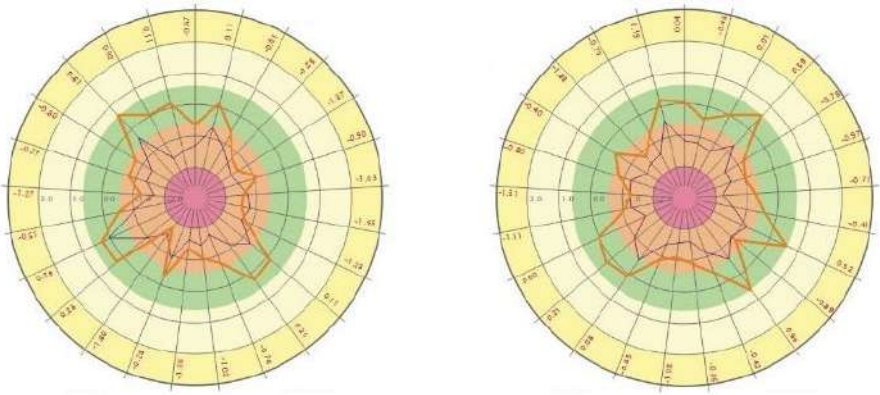


Energy Diagrams

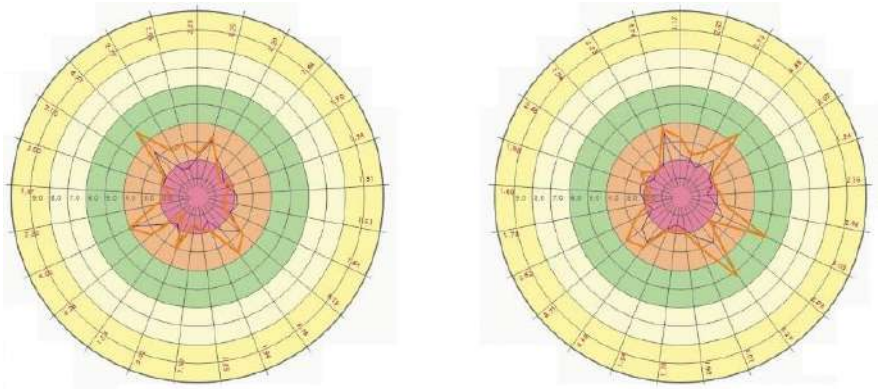
Example P7, 49 years old, uterine cancer.

Surgery. Chemotherapy, restorative treatment with natural remedies and diet. Feels well within self (generally weak).

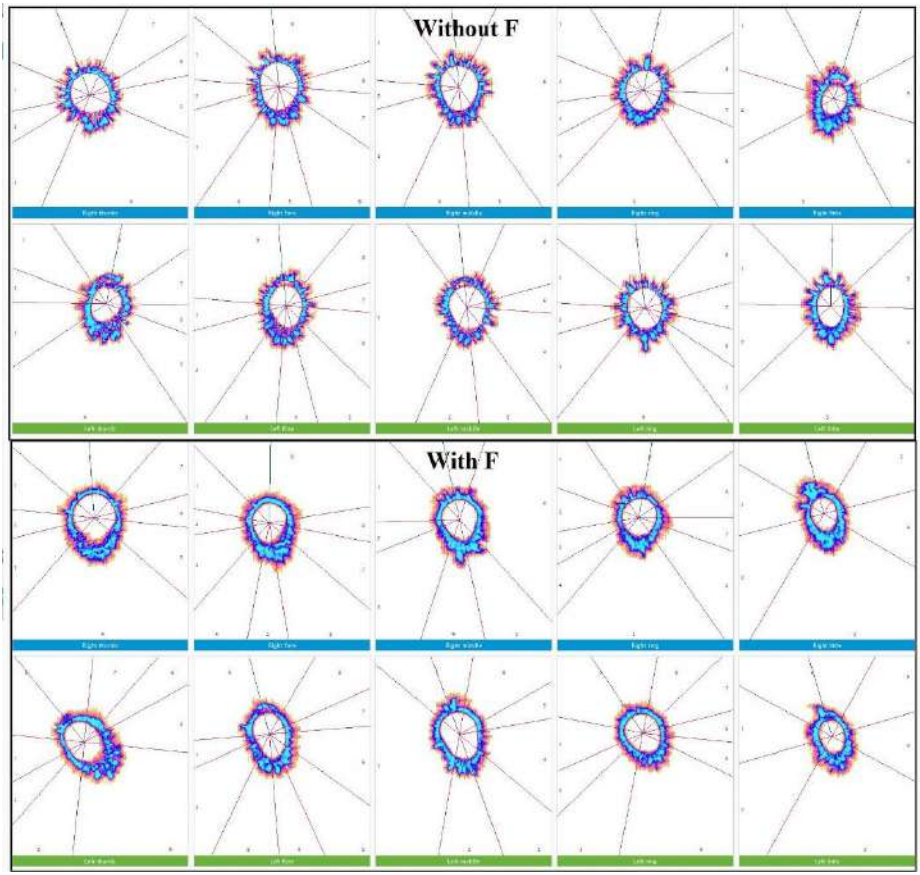
In the initial condition prior to beginning the restorative treatment, Bio-grams without F were weak, with clear defects in the uterine area 4L\4, endocrine sectors 1R\4, 1L\4. On Bio-grams with F defects can be observed in low sectors of practically all fingers. After three weeks of treatment, Bio-grams without F retained their character. After a further two weeks in the left hand, Bio-grams without F show clear emissions in the lower sectors. These emissions are typical of energy deficiency in the thyroid gland, which is in need of separate attention. Thus, in this case it may be said that there is good remission after the final treatment. Pay attention to the difference between Health and Enrgy Diagrams.



Health Diagrams



Energy Diagrams


Without F
With F

ASC (Altered States of Consciousness) homeostasis zone

In this condition there is a crossover to a fundamentally different principle of autonomic regulation.

In the ASC homeostasis zone the nature of Bio-grams changes completely, and they take on a number of characteristic signs, which can initially be split into 3 groups.

'Double rings,' which usually appear as a second ring around the Bio-grams, mainly in the lower sectors, although also in the upper sectors in a number of cases. Often the double ring is not fully formed, and is presented as separate emissions.

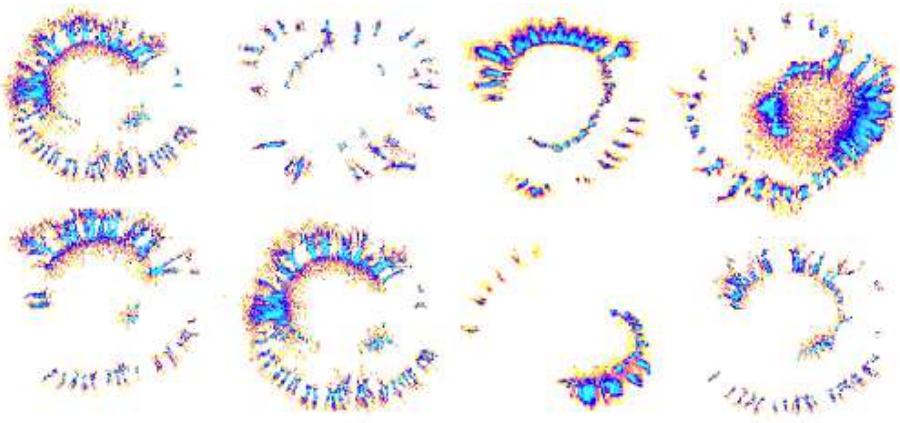


Fig. Double rings defects

The next group are blotches which stand apart, sometimes 'hanging in clusters' from the finger, sometimes at some considerable distance. Dynamic measurements have shown that these blotches are very stable and exist throughout the entire measurement, which could be tens of minutes.

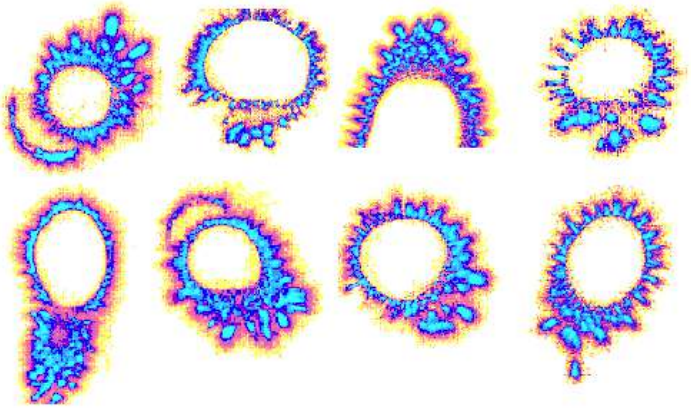


Fig. “Blotches” defects.

The third group are branch-like emissions, both individual and multiple, situated over the whole circumference of the

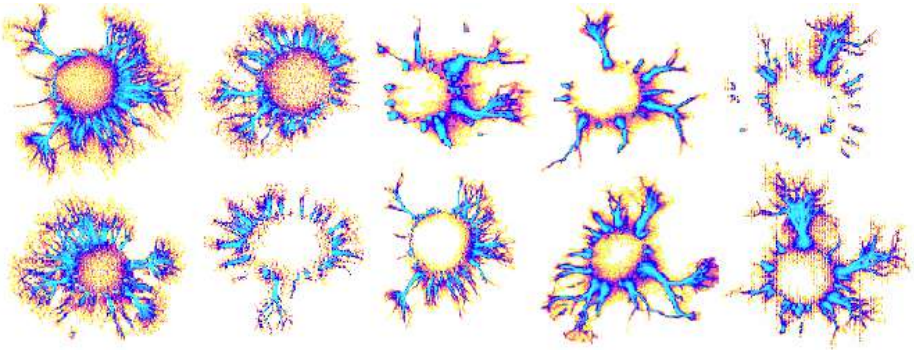
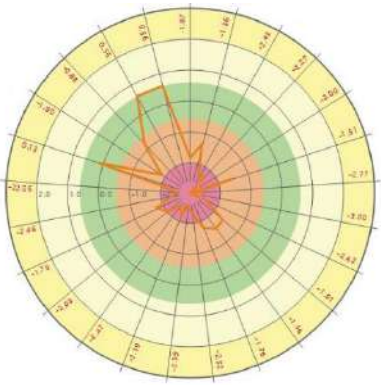
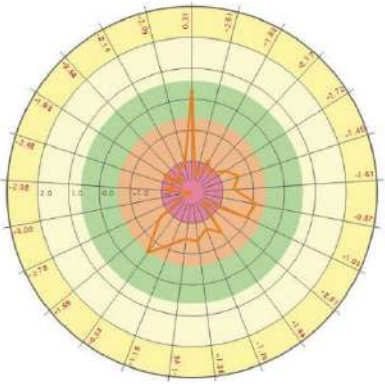


Fig. “Brances” defects.

These characteristic signs can appear on all of the fingers at the same time, as well as on individual fingers. As a rule, signs of one group can appear instantaneously. On the whole, this can be seen in Bio-grams without F, although also in Bio-grams with F in some cases the diagrams acquire a characteristic starry character, and the images of the field become almost empty. Diagrams in ASC have typical star-like character.





Bio-grams for the ASC homeostasis zone in individual fingers are quite common. This is an indicator of the active energy processes in corresponding zones, as a rule linked to specific pathologies. Moreover, in the majority of cases this is the particular condition of the psyche. These conditions appear most clearly in the so-called **altered states of consciousness – ASC** ([Bundzen et al., 2000]). People transit into these states through meditation, momentary training and under the influence of psychedelics and hypnosis. Mapping the brain's activity with the help of modern technology has made it clear that in an ASC, the brain switches over to a special status: the activity in the α frequency range decreases, the activity in other frequency ranges rises, and this activity is distributed from the frontal lobes of the hemisphere of the cerebrum to the periphery, gradually enveloping the whole cerebrum. EPI measurements show that changes take place not only in the brain, but in the whole energy system. This shows in a specific type of BIO-grams which we rank at level IV. Therefore, when registering such Bio-grams, it is necessary to explore with which ASC processes they may be linked. In many cases this may be psychic deflection which does not appear in behavior. It could also be linked to drug use, particularly in young people. Branch-like emissions in individual sectors are indicators of acute pathological states in the given system, especially if they appear in symmetrical sectors on the L and R hands. In the case of the EPI-gram of the ASC homeostasis zones, a sectorial diagnosis is not possible.

Part IV

The Refinements of Electrophotonic GDV Analysis

How many things by seson seson'd are
To their right praise and true perfection.
William Shakespere
The Merchant of Venice V, 1

Noise level

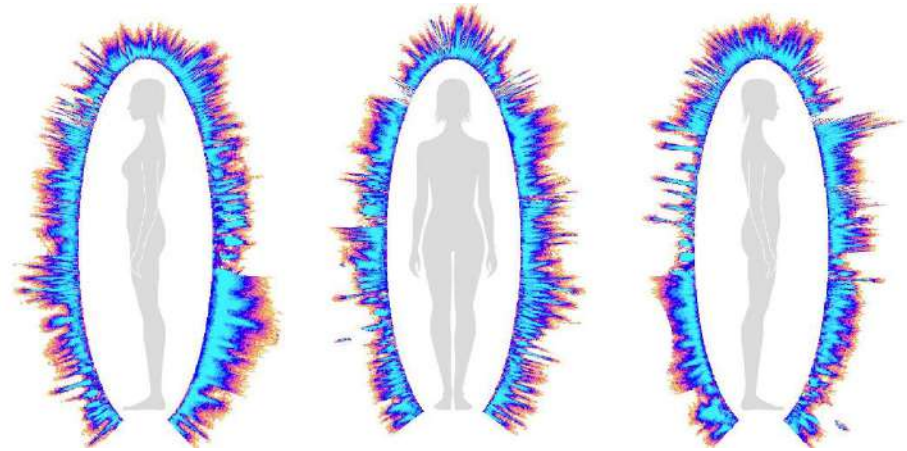
The 'noise level' is an important indicator of state. It characterizes the degree of clarification of the EPI image when compared against the background. Background radiance is formed on the basis of two main factors:

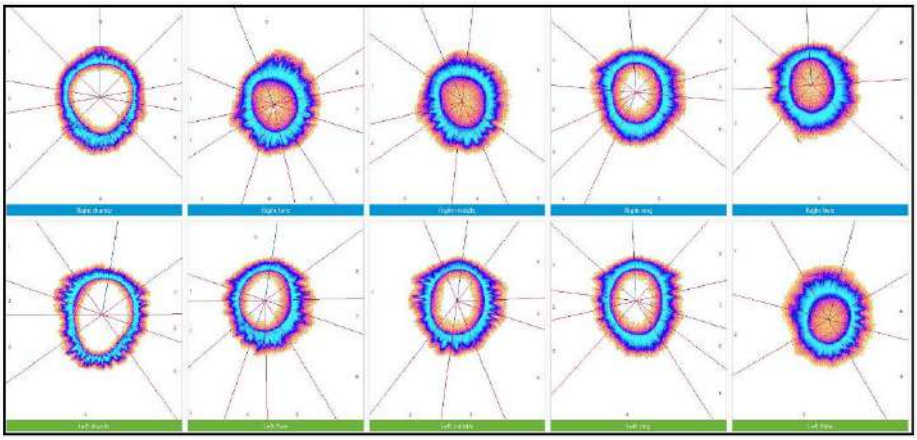
- Electronic noise of the CCD matrix
- Dispersed glow of the investigated item (finger).

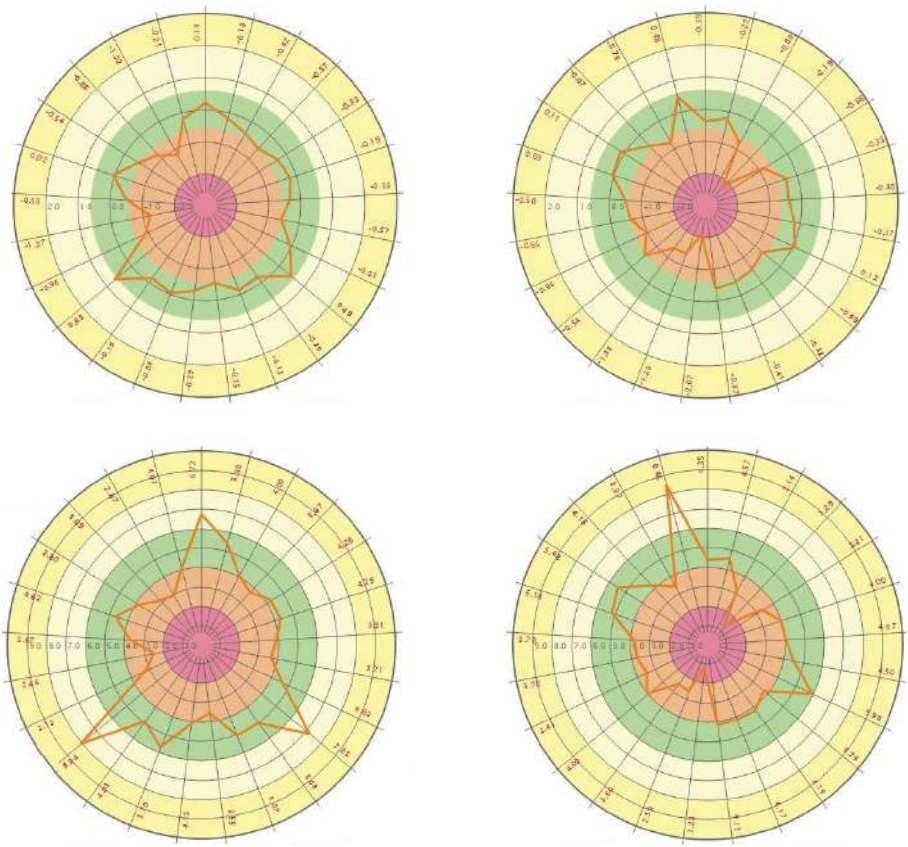
Electronic noise is an inherent property to any optical electrical device, and one of the ways of combating it is to cool the device. In EPI systems, the signal level significantly exceeds the noise level, and cooling is not needed. Isolating the images from the background is done by computer-processing the image with a choice of the determined level of noise or level of refinement.

The second important conclusion from studying the example is that **the noise level depends on the activity of the physiological system. It characterizes the level of dispersed bio-photon emission from the cutaneous covering.** The more active the system, the stronger the level of this background emission. It can be characteristic both of the activity of physiological systems and the stress level.

Example, woman 49 years old, leikemia.
Looking at the field image, we can see strong glow, particularly on the right side of the body, linked with the left half of the brain. This picture corresponds to the strong noice of the 2R,3R,5R and 5L Bio-grams. We pay attention to very uneven Diagrams, quite different for Health and Energy Diagram.



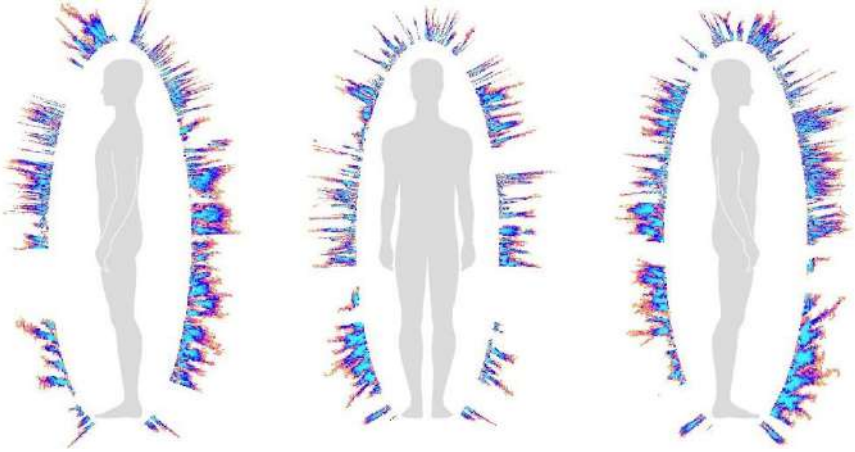




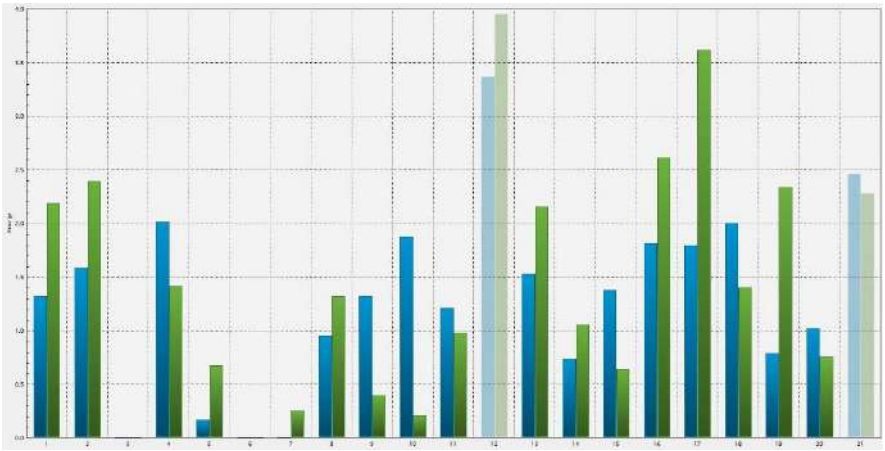
This woman died 2 days after the analysis. You would have never told this from her Bio-grams. Maybe, of course, it was last increase of energy before the death, which is often happening with cancer patiens. At the same time this is another indication, that GDV analysis is not a "magic mirrow" and we claim not more than 80% of correlation between GDV/EPI analysis and xlassical diagnostics.

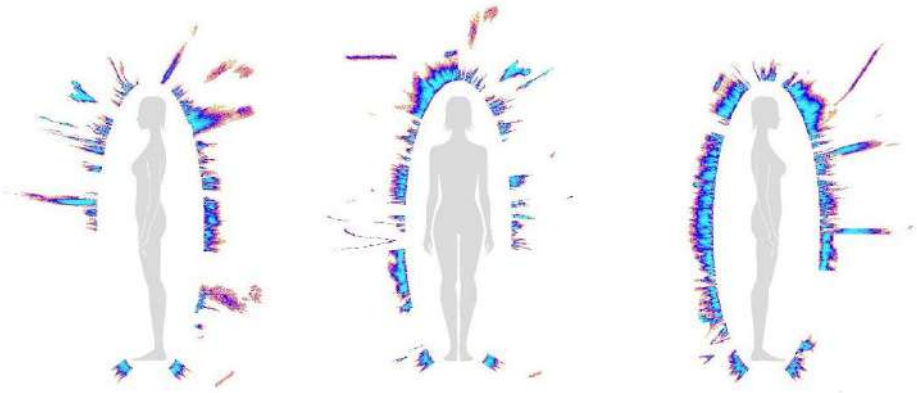
Stress Examples

High level of stress is clearly understandable form the GDV analysis. It may be measured both from 10 fingers and from 2 fingers. If you see Stress parameter more than 6, sectoral analysis is not aplicabale. You may see interesting information in the Balance program. Ask person to relax for 20 minutes, drink warm tea and repeat the measurement. Address psychological literature for stress management. BioCor device is very efficient in stress relieve treatment. Herewith we give seeval examples of stress.

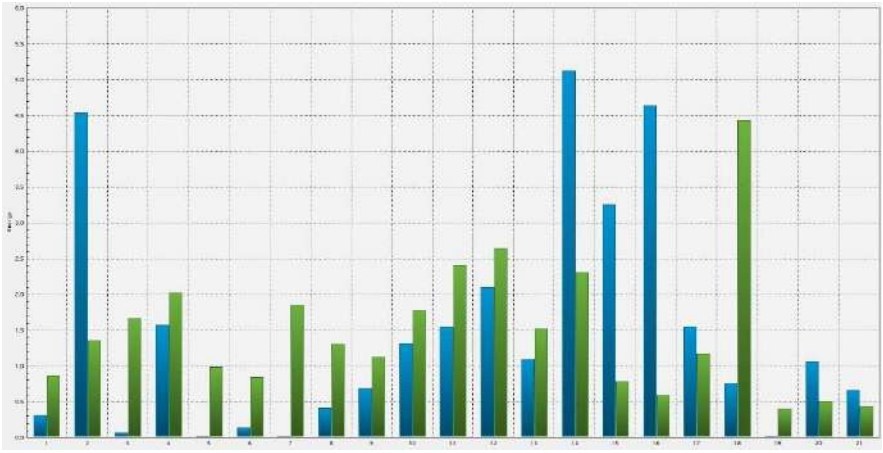


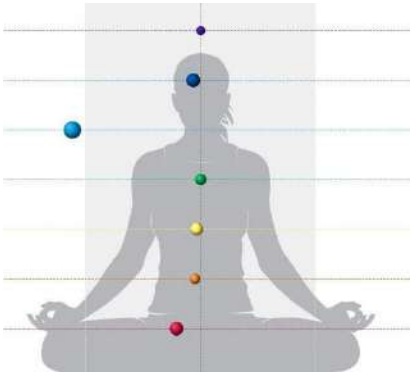
Stress = 7.33 Energy = 24.14 J



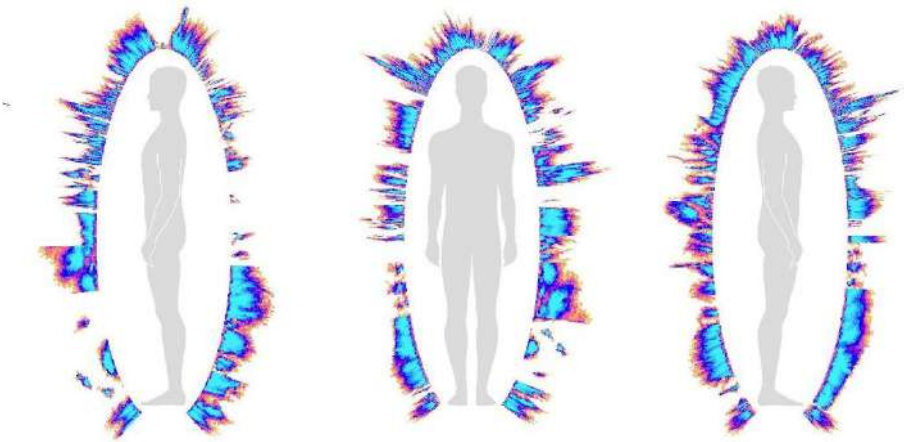


Stress = 10.0 Energy = 24.66 J

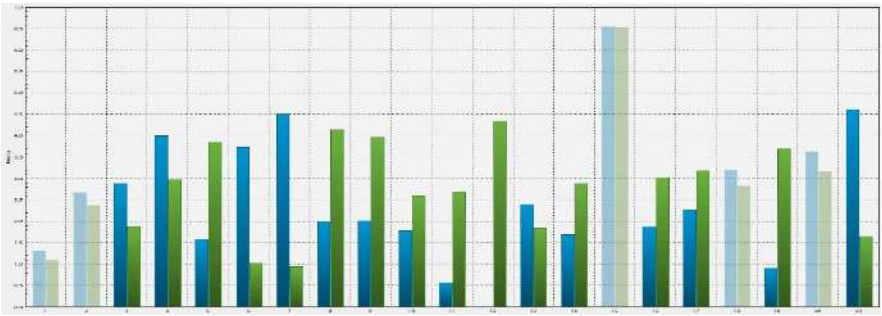


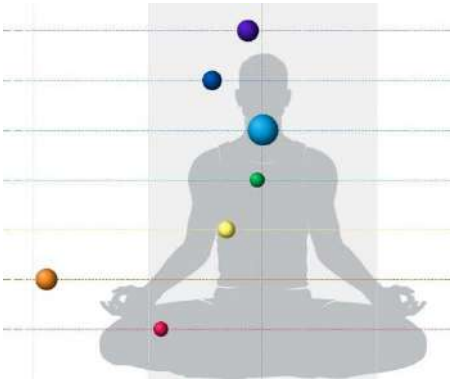


Chakras Alignment = 89% Alignment*Size = 17



Stress = 6.36 Energy = 37.08 J





Chakras Alignment = 73% Alignment*Size = 29

Sectorial analysis of EPI-grams

The idea that different fingers and toes carry information about the functional state of organs and the body has been well-known in Oriental medicine since ancient times. In traditional Chinese medicine, all the fundamental energy meridians begin and end with the fingers and toes. Acupuncture points on the fingers and toes can provide information about the working of the body, and can influence its conditions. In traditional Korean medicine one of the most important methods is correction of the body's state through the fingers. This method, called 'Su Jok' became famous in the West thanks to Professor Park Jae Woo. In bioelectrography, the first table showing the links between the glow of sectors of the fingers and the systems and organs of the body was put forward by Peter Mandel in 1986 [Mandel, 1986]. Since then, this principle was further developed as the 'principle of sector analysis.'

In accordance with this principle, **the fingers and toes reflect information about the physiological state of various organs and systems of the body.** The transmission of this information may be well founded from the point of view of two distinct systems: traditional Chinese medicine (TCM) and classic neurophysiology. In accordance with the principles of TCM, the fingers are 'linked' with the organs by energy channels or 'meridians.'

There have been many attempts to make the understanding of meridians well-grounded in terms of Western science, while specific point on the skin, having very low resistance, became well-known. In innumerable experiments it was, however, shown that changes in the physiological state of individual organs leads to a change in the electrical resistance of the corresponding acupuncture points.

In the early 1960s, Korean anatomist Bong Han Kim proposed the existence of a circulatory system that could be the anatomical basis of classical acupuncture points and Meridians. Henceforth the corpuscle-like structures corresponding to acupuncture points were referred to as Bonghan corpuscles (BHC). These initial observations used only relatively simple bioanalytical methods and light microscopy, they were not confirmed by US scientists, and Bong Han Kim, being under high negative pressure, commited suicid. In the beginning of XXI century his results were confirmed by a group of South Korean scientists. They've found threadlike structures (NTSs) on the surfaces of the internal organs of rats and

rabbits The ultrastructure of the NTSs revealed by cryoscanning electron microscopy and high-voltage electron microscopy showed that (1) there were cell-like bodies and globular clumps of matter inside the sinus of the channel with thin strands of segregated zones which is a microscopic evidence of the liquid flow, (2) the sinuses have wall structures surrounded with extracellular matrices of collagenous fibers, and (3) there exists a cribriform structure of sinuses. [Baeckkyoung Sung et.al. 2008; Jungdae Kim et.al. 2008]. This is scientific confirmation of the existence of energy meridians.

From the point of view of neurophysiology, the sensor zones of all organs are located in one region of the cerebrum, together with the sensor zones of fingers and toes. So the brain presents a unified system, and information which excites the nerve unit in a particular area of the brain can influence the nerve units in neighbouring regions of the brain. Theoretically the fingers and toes are not only able to pass sensorial information to the brain, but can also receive it.

However, all of these arguments would have remained speculative if they could not be clinically proven.

Nearly all sectors used in sector diagnostic charts of the EPI method of bioelectrography were substantiated during medical trials. There were considerable discrepancies, however, between the EPI bioelectrography sartorial analysis charts and Peter Mandel's tables.

Work on substantiating sector analysis took over 10 years, with the participation of specialists from Russian and US medical institutions. Hundreds of patients were studied in many different areas. Some of the data was published in articles and reports, and many of the conclusions were formulated in the context of regular EPI seminars. The substantiating of the sectors was not an end in itself; it was, however, a natural consequence of the clinical research being performed.

It is hard to list all the work accomplished, so only a few will be mentioned here. The major series of studies in the Department of Bronchial Asthma at the St Petersburg State Medical University, carried out under the direction of R.A. Aleksandrova, M.D., Ph.D., showed the link between the lungs, bronchi and endocrine system to the corresponding sectors on the 4th and 5th fingers [Aleksandrova, 2002]. In work accomplished by the Rostov Institute of

Obstetrics and Gynaecology, to analyze the state of the female reproductive system, the lower sectors of the 4th fingers were used [Gimbut, 2000]. In research at the St Petersburg Military Medical Academy, most of the material showed that the state of the digestive organs was reflected in the 2nd fingers [Polushin et al., 2002]. In studies on osteopathy, it was shown that the 2nd fingers reflected information on the status of the spinal cord [Vestnik, 2001]. In work carried out over many years under the direction of Prof. P.V. Bundzen, the majority of atheletes tested have shown that the psycho-emotional reaction is most clearly reflected on the Bio-grams of the 4th fingers [Bundzen et al., 1998, 2003, 2005]. That is why these particular fingers are used for dynamic tests when the body is showing reactions to different stimuli. A large quantity of experimental data to substantiate the sector analysis was published in the Proceedings of «Science, Information, Spirit" conference carried out between 1998 and 2009.

> *It should be noted that sector analysis is systemic in nature. This means that systematic autonomic dysfunction usually reflects well on BIO-grams of the fingers for patients with I and II level Homeostasis.*

Heterogeneity and defects of BIO-grams characterize mostly the autonomic imbalance of specific systems:

- the gastro-intestinal tract;
- the cardiovascular system;
- the nervous system;
- the endocrine system;
- the urino-genital system;
- the spinal cord;
- the liver, kidneys and prostate.

As far as individual organs such as the eyes, ears, teeth, parts of the gastro-intestinal tract or parts of the heart are concerned, the nature of the information presented on the fingers is far more complex. In a number of cases, there are clear signs in the corresponding sectors, although it is not always possible to distinguish them from the general picture. The analysis requires more experience and intuition. We would ask you to exercise the greatest accuracy when carrying

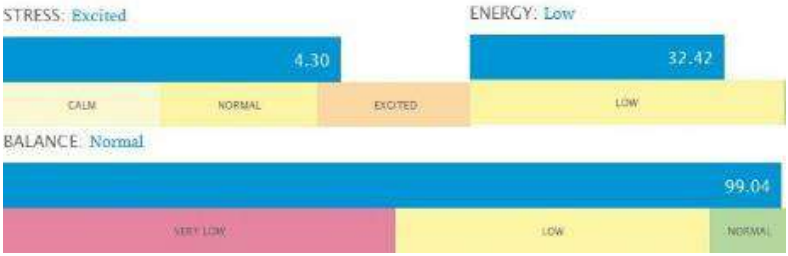
out such an analysis. It is far more reliable to remain at the level of system analysis.

At adaptation levels P and ASC, sectorial analysis does not work. Pathological signs may appear on any finger, regardless of the organ in question. Clearly, this is linked to the loss of the information link between organs and fingers. All that can be observed in these conditions is that there appears to be a general level of systemic abnormalities. These situations were described previously, during the discussion of homeostasis adaptation levels.

In all Eastern systems, the information is reflected in the fingers and toes. In Peter Mandel's photographic system, gas-discharge photographs are taken simultaneously of the fingers and toes, which are then subjected to visual analysis. The fingers carry information about the body's main systems and organs, while the toes supplement this information. In EPI only the fingers are used, which makes it possible to obtain the basic information required. The EPI+ setup makes it possible to obtain Bio-grams of the toes, although the law of analysis for this information has not been perfected clinically. This problem may be solved in future research.

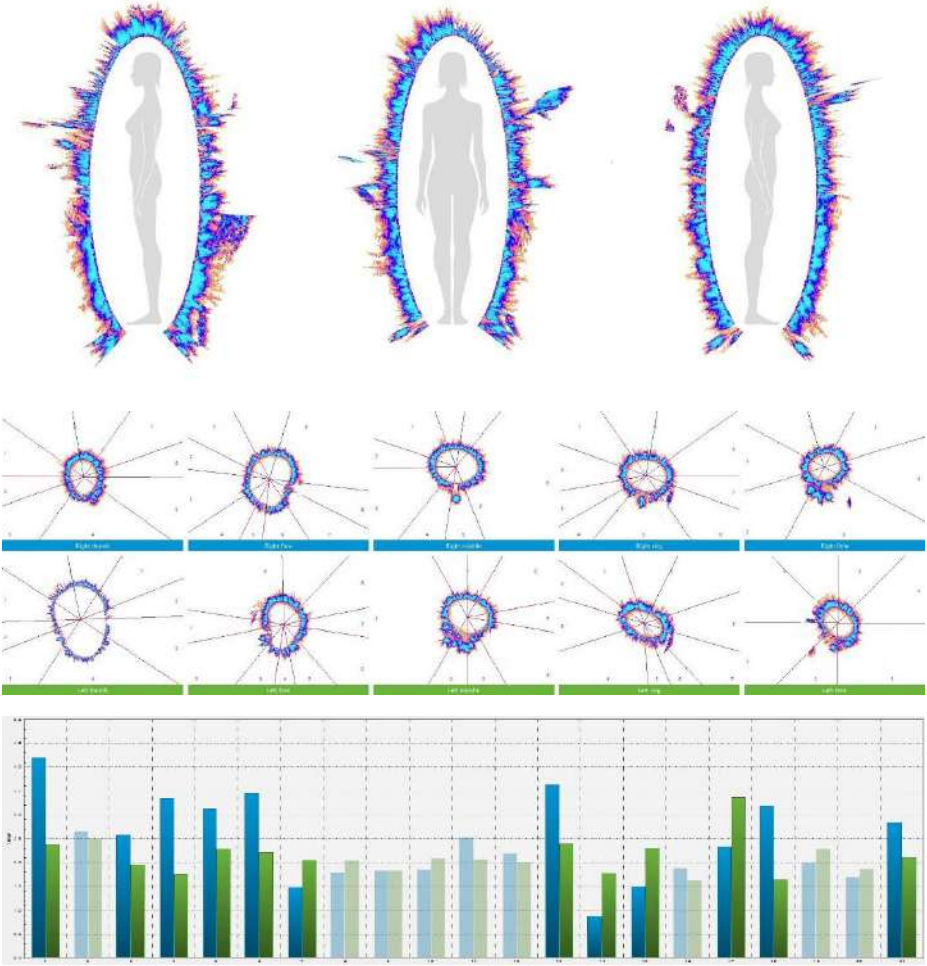
Example HS 7. Woman from Greece, 101 years old

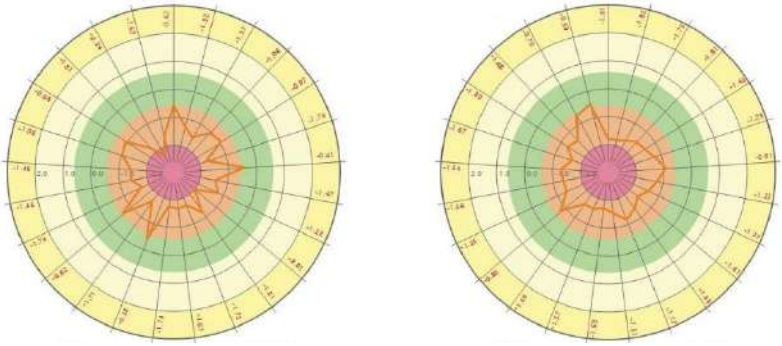
From the Analysis we see that Energy is low, stress level little above the norm, but balance is very good. This is confirmed by the Energy Filds pictures: they are quite uniform, but very dense, with many disturbances. Increased stress may be explained by the fact that BIO-grams were taken when this woman was visiting her son. All her life she lives in a little Greek village nearby the see. She was very healthy during her long life, but after 80 health issues were coming one after another. As we see from the Balance, Diagrams, Fingers and Report, she has many systems with low energy, which correlates wih her condition.



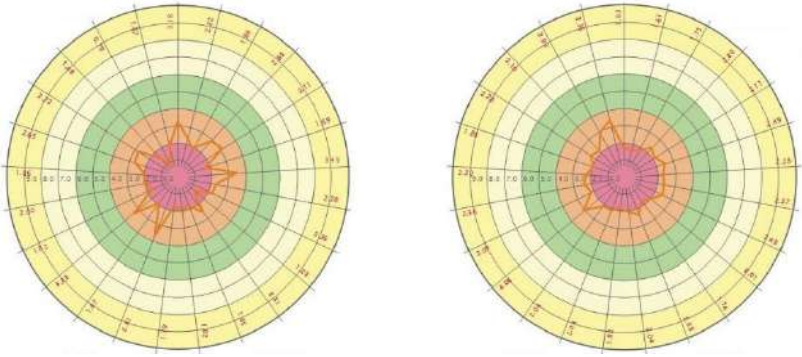
In particular, we pay attention to liver and kidney areas 3R/4,5 and 3L/2,3; respiratory zone 5R/3 and 5L/2,3; colon system 2R/6,7,8 and 2L/1,2,3; spine 2R and 2L; cardiovascular system 2L/1. Energy Diagram is less than the Health Diagram, which is understandable is this situation.

At the same time Chakras are well balanced – she was attending church all her life and now lives just opposite the church so she may have blessing from the priest every day. I ma sure that her high spirit and positive attitude to people is one the main source of her long life.

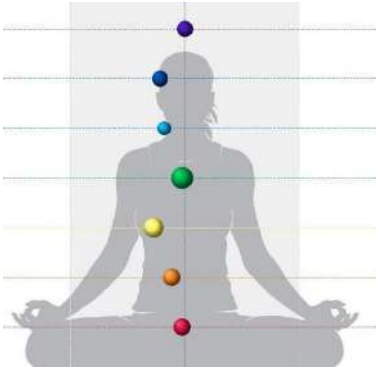




Helth Diagram

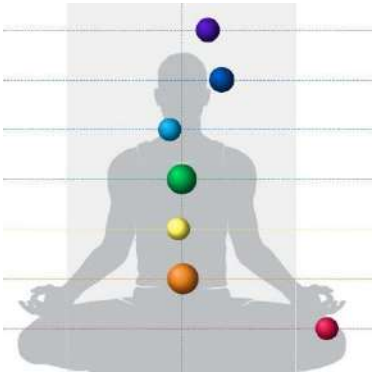


Energy Diagram

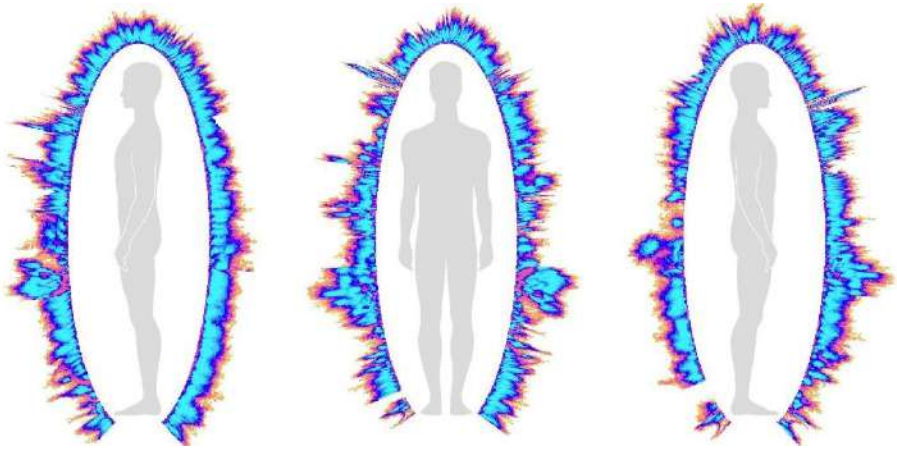


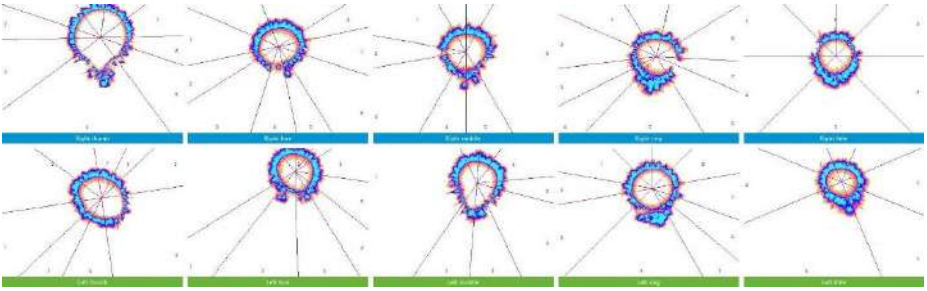
Example HS 8, man 57 years old

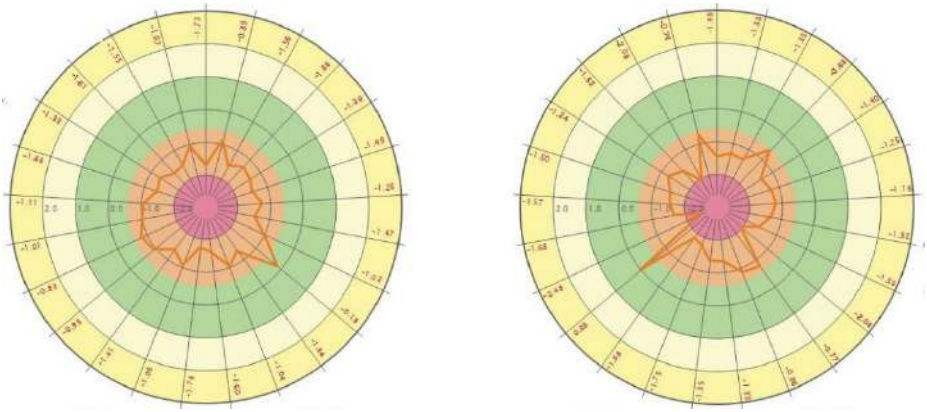
This person is having many health issues, which is impossible to solve by the conventional medicine methods. Stress level is slightly elevated (4.11), Energy is not high, but in the normal range (46.94), Energy Diagram is bigger, than the Health Diagram. From this we can make a conclusion, that this is not a severe deciese. Chakras are well balanced, so this is not stress, but physical problems.



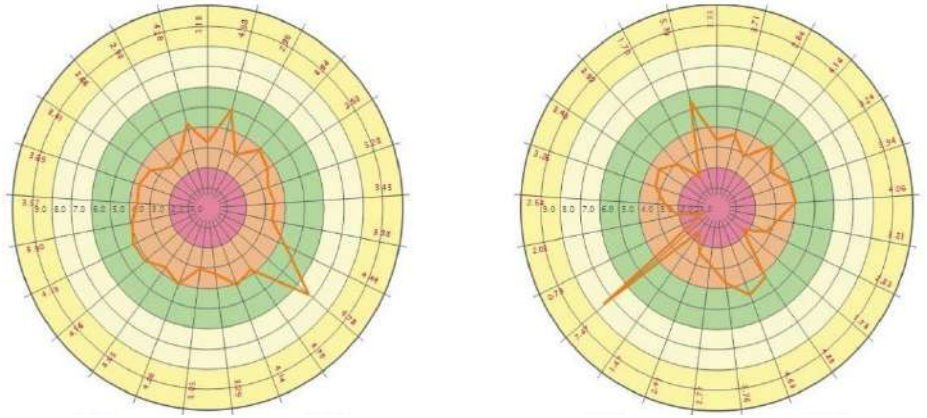
At the Energy Fields, there are many disturbances, reflected on fingers' BIO-grams.







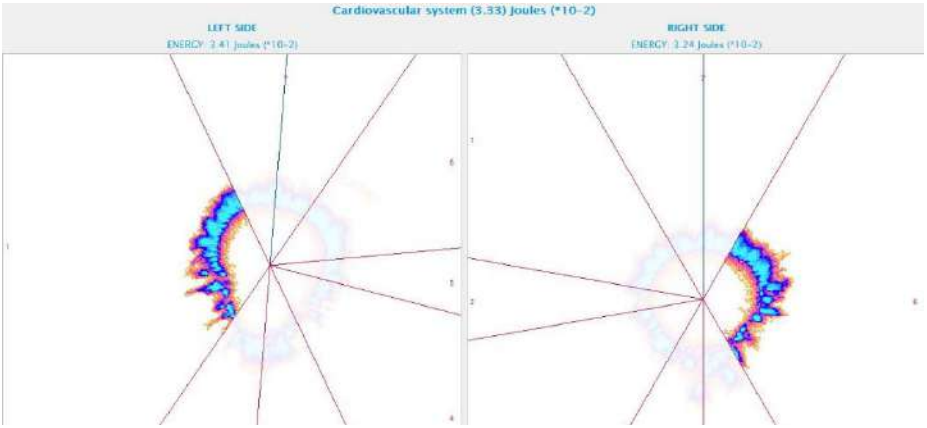
Health Diagram



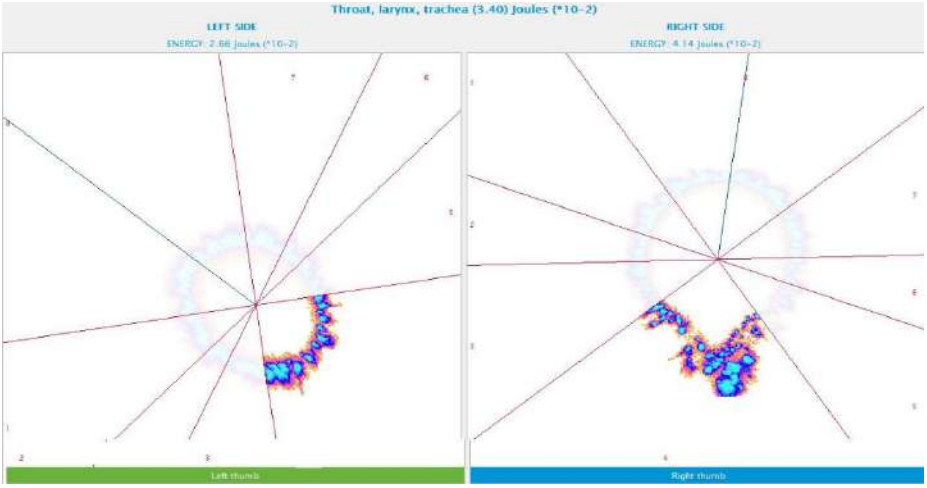
Energy Diagram

In the analysis, we use both Diagrams and Organs Energy program, which allows to check details.

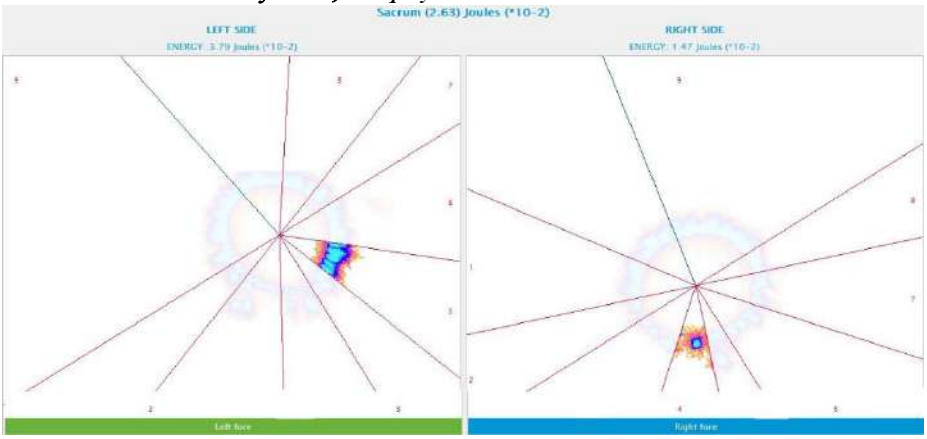
In ***cardiovascular system*** *strong deterioration indicate to the overall condition of the vascular system. This may be one of the main reasons of the health issues.*



In respiratory system, *we pay attention to the throat area. We may suspect tharoid gland, which we conform at the Endocrine system.*



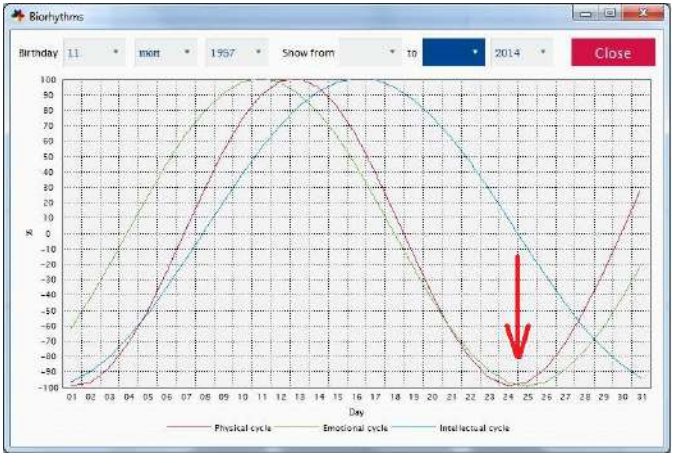
In Musculosceletal system, *we pay attention to Sacrum.*



Digestive system need attention and treatment, same as urino-genital system.

As a result, for this person we have to conclude that his situation is related to the overall mis-regulation of the energy system complicated by the deficiency in spine and blood circulation. Complex treatment with methods of integrative medicine would be the most efficient.

It is interesting, that at the moment of the GDV analysis this person had all his biorhythms in the lower position. In this situation all the problems are presented at the most.



We need to recommend to this person a set of analysis:

Arterial pressure – every 2 months
Biochemical blood analysis – every year
Analysis of feces - every year
Colon test - every 3 years
Hair analysis for microelements – every 3 years
Electrocardiogram – every year
Fluorography – every year
PSA test – every year
Dentist – at least once a year

Mild physical activity with pulse control on the level 100-120 beats/min (walking at least an hour per day, bicycle, games with children).
Regular check of arterial blood pressure, level of cholesterol.
Regular Detoxification of liver and body.
Regular meditation.
Exercises like Qi-gong, Tay-chi.
Spine massage with essential oils, osteopathy.
Exercises for eyes - "Palming", eyes movement, deep blinking, massage around eyelids.
Balanced diet
Eating Well - Healthy Foods Instead of a Diet.
Eating a healthy diet is another part of the healthy lifestyle. Not only can a clean diet help with weight management, it can also improve your health and quality of life, as you get older. You can use these tips for simple ways to change how you eat:
Sneak in more veggies. Have salads every day. Add veggies wherever you can -- a tomato, peppers Switch off salad dressing. Use only non-refined veggie oils of different kind. You may find a big variety of them in any healthy store. Add lemon juice.
Eat more fruit. If you do not have a special diet, you may eat up to four different fruits a day. Eat low-fat or fat-free dairy.
Make some substitutes. Look through your cabinets or fridge and pick foods you eat every day, the next time you're at the store, find lower-calorie substitutes for just those items.
Write down the nutritional content of your everyday food.
Most of your grain and cereal products should be made from whole grains, not from refined flours. This part of your list includes whole grain breads, whole grain pastas, and whole grain breakfast cereals. Whole grains are important for vitamins, minerals, and for fiber, which is often lacking in modern diets. Read

labels to look for 100% whole-grain or 100% whole-wheat to be sure you are getting whole grain products.
Your protein and meat choices should consist mostly of fish, poultry and lean meats. Eggs, nuts, seeds and legumes are also good protein choices. Choose fresh and frozen unbreaded meats and fish. Avoid breaded, deep-fried convenience foods. They are high in fats and sodium.
Control salt and sweets.
Preparation of food in a healthy way - Zepter cooking stuff and the like.
Avoid deep fried, breaded foods.
Mediterranean type of eating, macrobiotic type and the like are beneficial for health.
Special Wait Loss Diets may be specially selected.
Please, avoid preserves, canned food, fast-food, sweet drinks. Read labels and chose foods wisely. Avoid frozen pizzas, pocket-sandwiches, deep-fried appetizers, battered, breaded and deep fried foods. Processed lunch meats, hot dogs, bacon, and sausages, white bread and refined pasta have a lot of saturated fat and nitrates in them you don't want in your body. Sugar is a main danger!
Special attention to water - Water is Life - Good Water is Good Life. Natural spring no gas water is recommended. Install filters in your home, water structurisation is optimal. Add gem stones, silicon, shungit, etc to silver jar and let water stay for an hour.
Glass of water in the morning and before every meal.
Tea and coffee is a food!
Dietary supplements are vitamins, minerals, herbs and other substances meant to improve your diet. Choose a list after consulting with nutritionist.

Basic rules of EPI analysis

In order to correctly analyse the physiological state, i.e. the level of energy of the organs and the systems (or in other words, the level of autonomic regulation, in accordance with the adaptation levels) it is necessary to take the following steps:

Different EPI programs reflect different aspects of a person's energy status. Bio-grams must be processed in all programs and it is advisable to print out the following:

- Bio-grams of all fingers without filter;
- Bio-grams of all fingers with filter;
- Health and Energy diagrams;
- Energy Field projections.

When classifying EPI data by adaptation level, we look at the following factors:

- Specific features on Bio-grams without F and with F;
- Distribution of EPI diagrams.

The **H homeostasis zone** is characterized as follows:

- BIO-grams without F have a small number of defects;
- BIO-grams with F have no defects;
- Both Diagrams lie in the optimal zone;
- The level of activation $0 < S \leq 4$;
- Diagram variance < 0.5.

The **HS homeostasis zone** is characterized as follows:

- BIO-grams without F have defects;
- BIO-grams with F do not have substantial defects, but are more heterogeneous than in H zone.
- Diagram without filter lie totally or partially in the energy deficit zone;
- Diagram with filter may have energy deficit zones;
- R-L imbalance;
- Level of activation $2.5 \leq A \leq 10$;
- Diagram variance > 0.5;

In H and HS homeostasis zones, we apply sector analysis.

The **P homeostasis zone** is characterized as follows:

- BIO-grams without F have a specific 'partial-continuous' appearance or are distinguished by a large number of defects on all fingers;
- BIO-grams with F have a specific 'cloudy' structure in a number of sectors. The more sectors there are with this structure, the worse the condition.
- BIO-grams with F have a large number of defects and homogeneity.
- Diagrams lie in the upper limit of the optimal zone or beyond it.
- The level of activation does not provide useful information.

The **ASC homeostasis zone** is characterized as follows:

- BIO-grams without F have specific defects in the form of individual blotches, branches or double rings.
- BIO-grams with F can have the same appearance as is characteristic of H and P homeostasis zones, while also being distinguished by a large quantity of 'blanks-holes'.
- Diagrams without F have the typical 'starry' appearance.

The sectorial diagnosis in P and ASC homeostasis zones can be applied with greater accuracy.

A high level of 'background' noise is typical of increased physiological activity in the body's systems, linked to the high level of activation.

During analysis, the age and gender of the patient should be taken into account; these factors are included in the evaluations by EPI programs.

In all of the EPI programs, you may get detailed background information on the image. You need to click with the right mouse button at the back of the image, choose "View", and you will see the separate information screen. Together with information on the parameters of the image you may check the time of capturing and appropriate calibration information.

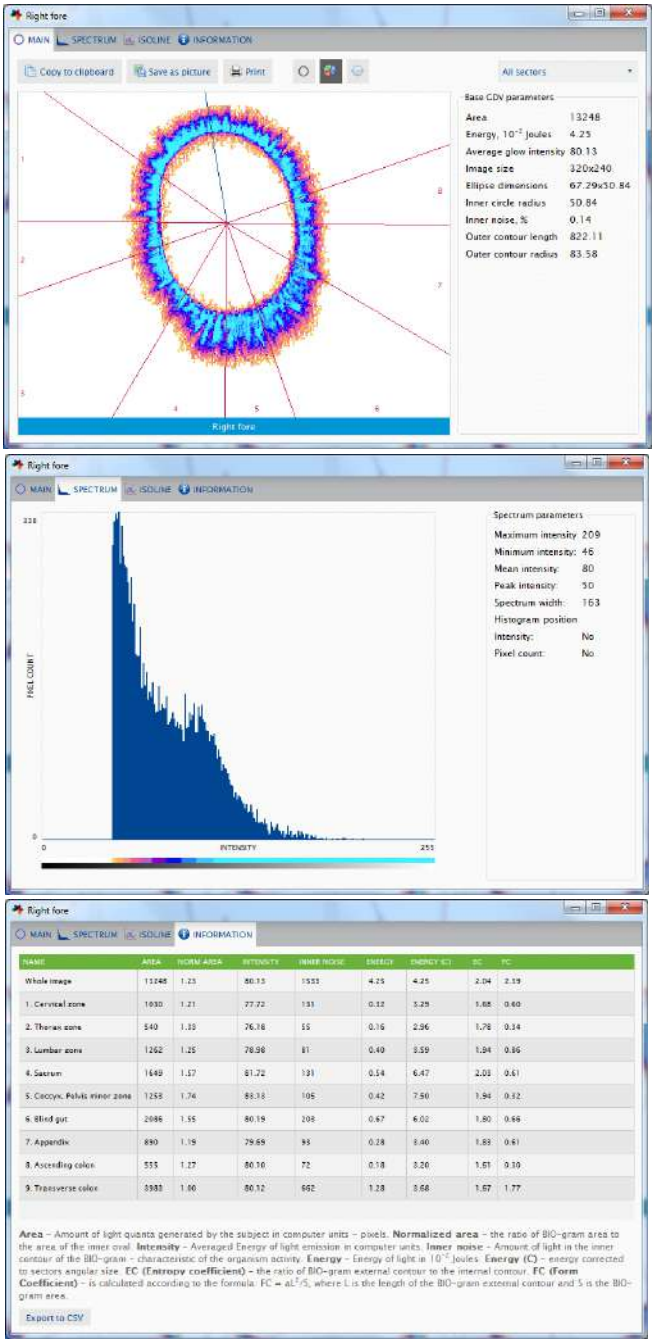

Right fore
MAIN
SPECTRUM
ISOLINE
INFORMATION
Copy to clipboard
Save as picture
Print
All sectors
Base GDV parameters
Area 13248
Energy, 10⁻² Joules 4.25
Average glow intensity 80.13
Image size 320x240
Ellipse dimensions 67.29x50.84
Inner circle radius 50.84
Inner noise, % 0.14
Outer contour length 822.11
Outer contour radius 83.58
Right fore
Right fore
MAIN
SPECTRUM
ISOLINE
INFORMATION
Spectrum parameters
Maximum intensity 209
Minimum intensity 46
Mean intensity 80
Peak intensity 50
Spectrum width 163
Histogram position
Intensity: No
Pixel count: No
PIXEL COUNT
INTENSITY
Right fore
MAIN
SPECTRUM
ISOLINE
INFORMATION
NAME AREA NORM AREA INTENSITY INNER NOISE ENERGY ENERGY (C) EC FC
Whole image 13248 1.23 80.13 1533 4.25 4.25 2.04 2.19
1. Cervical zone 1030 1.21 77.72 133 0.32 5.29 1.68 0.40
2. Thorax zone 540 1.10 76.16 55 0.16 2.96 1.78 0.14
3. Lumbar zone 1262 1.25 78.98 81 0.40 3.59 1.94 0.86
4. Sacrum 1649 1.17 81.72 181 0.54 6.47 2.01 0.61
5. Coccyx, Pelvis minor zone 1258 1.74 88.38 105 0.42 7.50 1.94 0.32
6. Blind gut 2086 1.55 80.19 208 0.67 6.02 1.80 0.66
7. Appendix 890 1.19 79.69 93 0.28 3.40 1.83 0.61
8. Ascending colon 555 1.27 80.10 72 0.18 3.20 1.61 0.30
9. Transverse colon 3983 1.00 80.12 662 1.28 3.68 1.67 1.77
Area – Amount of light quanta generated by the subject in computer units – pixels. Normalized area – the ratio of BIO-gram area to the area of the inner oval. Intensity – Averaged Energy of light emission in computer units. Inner noise – Amount of light in the inner contour of the BIO-gram – characteristic of the organism activity. Energy – Energy of light in 10⁻² Joules. Energy (C) – energy corrected to sectors angular size. EC (Entropy coefficient) – the ratio of BIO-gram external contour to the internal contour. FC (Form Coefficient) – is calculated according to the formula: FC = aL²/S, where L is the length of the BIO-gram external contour and S is the BIO-gram area.
Export to CSV

Fig. Informational screen.

With appropriate calibration, diagrams can give very important information. We pay attention not only to the energy of particular systems and organs, but also to the differences between right and left diagrams may be an indication of troublesome information.

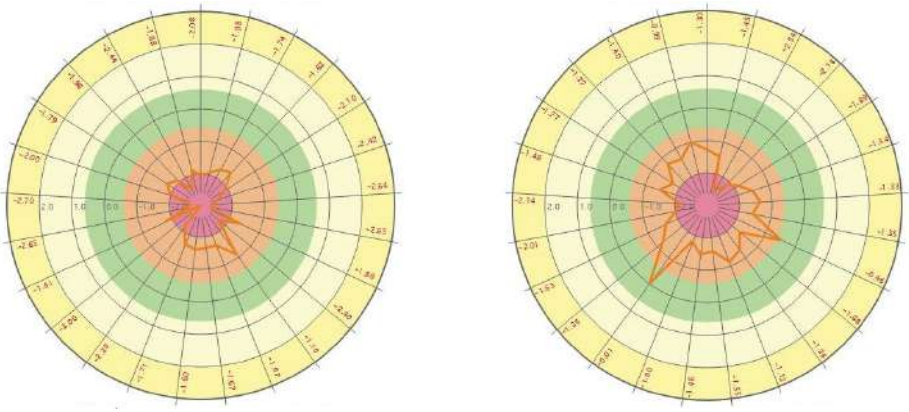


Fig. Difference between right and left diagram.

Another troublesome sign – when all diagrams are in the hyper-energy zone.

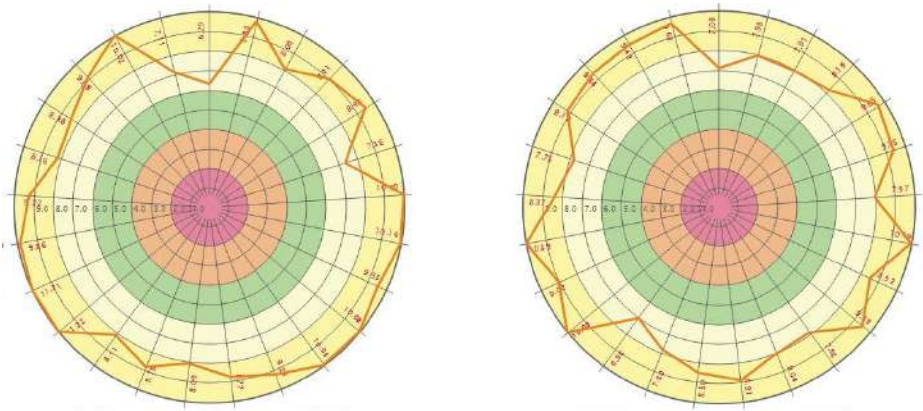


Fig. Troubleshooting diagram.

Following the specified practice, the EPI method makes it possible to carry out a reasonably accurate analysis of the physical and psychological state of the

patient. To a large extent, the accuracy of the analysis depends on the depth of understanding of systemic principles of how the body works, and whether it is perceived as a unified, holistic, indivisible system. In order to work out such an approach, some knowledge of the principles of Traditional Chinese Medicine (TCM) is very helpful. They are based on the idea of the circulation of energy, and these ideas are fully reflected in the practice of GDV/EPI bioelectrography. We gauge the movement of energy through systems and organs, and in many examples we can see the direct reflection of the principles of TCM.

In addition, knowledge of these principles facilitates the development of clinical intuition, and, by placing reasonable trust in one's own 'inner voice,' it is possible to make an accurate and in many cases unexpected analysis based on EPI data. Many doctors who have used EPI over many years have indicated similar experiences.

> *Trust the information provided by the EPI data without concerning yourself with the outward appearance of the patient. In the case of systemic illnesses, appearance is deceptive. EPI pictures give authentic information on the person's energy state.*

A totally intuitive path of analysis was developed by M. Shaduri based on the intuitive identification of images of organs in EPI images. This path is based on intuitive guesswork, and EPI images play the same role as Tarot cards - by giving information to those with a gift – but they are not an objective means of analysis.

Monitoring of the patient's condition during treatment

EPI bioelectrography is a unique method for monitoring the condition of the patient during any kind of influence. The capture is non-invasive, does not affect the condition, and can be done without restrictions.

There are two basic monitoring methods:

– Periodic captures of all 10 fingers;

– Periodic captures of two fingers (4L, 4R) during a set period of time.

Fingers 4L and 4R reflect the condition of the endocrine system, and as shown by the factorial analysis method (Bundzen et al., 2003, 2005), are most sensitive for detecting the influence of subtle interventions.

After the intervention (e.g. taking of medicines, therapy, massage, Reiki, etc.), it is necessary to wait for another 15-30 minutes for the effect of the influence to register. Immediately after therapy, there is a reaction by the autonomic and central nervous system, and time is needed for the condition to stabilise.

Basic changes can be observed in BIO-grams, and the most demonstrable means is the structure of the diagrams. It is equally important to monitor changes in the Energy Field, as much for reactions of individual systems and organs.

When the correct treatment has been selected, the Energy Field pictures before and after the treatment help the patient to validate that the treatment is effective, which in its turn increases the treatment's degree of success.

Capturing BIO-grams of one or two fingers is a sensitive method for registration of subconscious reactions to an influence. It can be used for the selection of medications, according to the following protocol:

1) Capturing BIO-grams of 10 fingers.

2) Determination of risk zone (for example, thyroid gland – 1L, 1R).

3) Taking BIO-grams of 1R, 1L fingers 10 times. (Choice of finger depends on the identified risk zone).

4) Selection of medication (for example, homeopathy).
5) Patient holds medication in unopened packaging in left hand, BIO-grams taken 10 times.
6) Patient holds medication in right hand, BIO-grams taken 10 times.
7) Images before and after test are compared.
8) The patient takes sealed bottles of clean water and holds them for 5 minutes.
9) Measurements (3) – (6) should be repeated with another medication if necessary.

An effectiveness criterion is the disappearance of pathological indicators.

Dynamic EPI capture

The recording of Bio-grams from the hands or other objects over a set period of time, without changing the position of the object on the electrode, is called dynamic EPI capture (DC EPI). During this process, AVI files are recorded at a frame rate of 30 frames per second. The duration of capture can range from 10 seconds to several minutes.

DC EPI is applied in a set order when examining liquids, plants and materials. In the next section you will find the protocol and results of a number of examinations of materials using the EPI method.

DC EPI of the fingers is applied when special experiments are being carried out. For this mode, it is preferable to use the GDV Pro or GDV Express instrument.

DC EPI is a sensitive method for the detection of energy resources in the system.

Analysis of psychological condition

Numerous experiments on large groups of atheletes [Bundzen et al., 2003, 2005] and the population of various countries [Kondratiev, 2003; Measuring Energy Fields, 2004], have shown that EPI parameters have good statistical correlation with the results of psychological tests. This then led to the conclusion that EPI parameters can be used to determine the psychological characteristics of a person.

The parameter of activation or stress is one of the most important methods for analysing the psycho-physiological state of a person. It makes it possible to identify the state of tension and observe correcting this state during treatment.

Stress is one of the negative factors in our civilization, and continual stress, distress, worry, irritability and anger inevitably lead to the development of pathological states.

The activation-stress coefficient is calculated in the *EPI Diagram* program on the basis of the comparison of all 10 BIO-grams parameters with statistical parameters of apparently healthy person. As we have seen from the analysis above, this parameter works well for H and HS homeostasis zones, and in a number of cases for ASC zones, but is of no use for the P homeostasis zone.

This variation in use for ASC zones is connected to the fact that the activation parameter reflects the level of regulation from the ANS, but in the ASC homeostasis zone, this regulation is lacking.

Visual analysis of the field images and diagrams also makes it possible to carry out a number of psychological assessments. They are based on the characterization of states depending on the type of energy and the activation level, and are fairly approximate. A number of characteristic indicators should be taken into consideration here.

> *The activation coefficient of the right diagram and right side of the body on the field picture is linked to the left hemisphere of the cerebral cortex.*
>
> *The activation coefficient of the left diagram and left side of the body on the field picture is linked to the right hemisphere of the cerebral cortex.*

The left brain governs logic, speech, behaviour control, business and optimism.

The right brain governs emotions, feelings, subconscious perception of activities, intuition, artistry and pessimism.

Accordingly, if there is a clear bias of R and L activity, one can boldly put the person down as having this or that set of psychological characteristics. A lot has already been written describing the influence of the R and L side of the brain on a person's behaviour, and it is worth your while familiarizing yourself with this before carrying out the analysis.

The next level of psychological assessment is linked to the analysis of the activity of individual fingers. With great caution it is possible to link these with various areas of a person's psychological activity.

The thumb: the head; characteristic of intellectual activity.
The index finger: ability to express oneself and influence others.
Middle finger: secretiveness, perseverance, self-confidence.
Fourth finger: emotionality, sensitivity, libido.
Little finger: warmth of feeling, relations with other, sensitivity.

These correlations are very approximate and are only intended to give an indication.

Each level of homeostasis is linked with a certain psychological state. This is determined by the influence of the level of energy on a person's behaviour, which can facilitate the manifestation or suppression of one or another psychological quality.

H homeostasis zone – powerful, strong, consistent character, receptive to the affects of others through own ideas.

HS homeostasis zone – person given to panic, doubts and anxiety, whose degree of influence is determined by the level of activity. It should be noted that the 'holes' in the field picture characterise the openness of the psyche to external influences and the influence of others.

P homeostasis zone – reticence, closed off when unsure inside or during fight. Complicated psychological points in life.

ASC homeostasis zone – altered states of consciousness, special psychological states including psychological denial. Influence of others, split personality, high level of emotional stress.

These indicators, when taken as a whole, enable us to carry out a psychological analysis which reflects well the person's inner world. The main advantage of this approach is that psychological assessments are made on the basis of data from objective measurements, irrespective of the person's desire to present him or herself in a particular light.

The developed software tools and expert methods for assessing psychological states make the EPI method a unique instrument for psychological and psychiatric practice.

Using EPI parameters when analysing data

In various GDV programs more than 20 independent parameters are calculated. The principles of their computation have been thoroughly studied and described in articles, books and dissertations, as well as in the program descriptions. For the present discussion I wish to focus on the possibilities of using EPI parameters, both for the practical work of doctors and in research activity.

In the everyday work of a doctor, EPI parameters can be used for two purposes:

– Express analysis of the overall condition of the patient, as well as individual organs and systems;

– Monitoring of parameters during treatment.

Parametric analysis of the condition is done by comparing parameters of the given patient with a **corridor of norms (range of norms)**. This corridor depends on age and, in some cases, sex. Numerous studies have shown that the most constant EPI parameter is the JS coefficient from the *EPI Diagram* program. In accordance with calculation principles, it does not depend on the size or position of the finger, and compares well when various types of capture and various devices are used. As we have already seen from the examples cited above, the JS parameters of EPI diagrams reflect well the body's reaction to influence, treatment and surgery, while remaining stable. The range of norms for this parameter was determined on the basis of statistical analysis of a large quantity of data of apparently healthy people in various countries.

These ranges are presented by way of a middle zone in the curves of diagrams.

In this particular program, another important parameter is calculated: the diagram variation coefficient RMS. It is shown in brackets displayed near to the JS value. For a normal state, this RMS coefficient ≤ 0.35. When RMS > 0.5, we are dealing with a highly variable condition **which typifies the instability of autonomic regulation.**

When using parameters JS and RMS, the following points should be taken into account:

- The Diagram analysis carries information on the state of health only for the H and the HS homeostasis levels.
- It is necessary to ensure that calibration has been performed correctly. Incorrect calibration completely distorts the parameters of the EPI diagram.

At the same time, if you use the EPI device in the same place, with stable room conditions, calibration parameters hardly change at all, and it is not necessary to recalculate them for every capture.

An important parameter is the **image surface area.** Obviously it is used when comparing data from one and the same person from different points in time. This possibility has been realised in the latest version of the program *EPI EF*. Comparison of the areas of Bio-grams from different people requires great accuracy, as the area depends on the size of the finger. Moreover, this parameter can also be used with great accuracy in practical work. For example, in the work of Venezuelan colleagues [Olalde et al., 2005] it was accepted that a surface area of less than 21 000 pixels is an indicator of degenerative inflammations. This criterion was used successfully when analysing treatment data.

The noise coefficient typifies the level of energy activity of the physiological systems. It is calculated during image processing and characterizes the quantity of background pixels removed during noise removal. We have already looked at the significance of 'noise' parameters for condition assessment above.

NB:

All EPI parameters depend on the selected level of 'noise' processing and on the settings of the camera during capture process. Make sure that these settings are correct and constant.

Entropy is a measure of diversification. High entropy signals chaos and low entropy signals death. Like many of the body's parameters, entropy values must be within the range of norms. At the current time the limits of this range are being determined on the basis of a new, enlarged database. **In all processes,** be they physical, chemical or biological, **entropy increases.** Living organisms reduce

their own entropy by using energy from the environment. It is said that living organisms produce negative entropy or 'neg-entropy.'

> *In EPI programs, the absolute information entropy of images is calculated. Of greater practical significance is the specific information entropy relating to the unit of the image surface area. When therapy is performed correctly, EPI entropy reduces.*

The intensity of glow characterizes the clarity of radiance of the whole image or of individual parts. This parameter is measured by the computer in relative units from 0 (totally black) to 225 (totally white). Comparing data from a single person, or group participants taken in different moments in time, according to the clarity of BIO-grams, is a convenient and visually effective method.

The remaining EPI parameters are mainly used when doing a statistical data analysis. In the GDV programs, a large number of parameter sets are computed, and these parameters are used for factor and correlation analysis, whose principles of application require special training.

Energy fields, meridians and chakras

The principles discussed about physiological regulation are based on concepts of Western science and Western medicine. The disenchanted reader might interject, "But where is all the charm of fields, energies, meridians and energy channels? For all those years we studied the Kirlian effect and EPI so as to be able to measure these mysterious yet appealing parameters. Has all that really been forgotten and lost?"

Of course not. We do not intend to turn away from the axioms and catchwords advanced in previous years. We have more grounds than ever for continuing to affirm that we really are objectively measuring the energetic activity of fields, meridians and energy canals. At the same time we are also measuring the activity of the autonomous nervous system. How do these two things fit together?

For thousands of years, health and longevity have been the subject of extensive research in all of the world's civilizations. Doctors, practitioners and astrologers tried to penetrate the mysteries of life and death. They developed concepts trying to explain illness and ageing, temperament and character. The majority of these have been lost in the sands of time, and only faint echoes have reached us through scraps of manuscripts. But the manuscripts which did reach us are based on principles which differ from the Western materialistic outlook. These are the principles of the Earth, the energy of trees, grass and people. During the expedition to the land of the Sierra Nevada Indians in Columbia, we spoke to them in the language of energy, and they accepted us, opened their soul and sanctuary to us. So when we speak about energy fields, about meridians and chakras, we are using a language created by other civilizations – a language which, on an intuitive level, hands down ideas which have been proved by the practice of thousands of years.

> *The EPI method bridges the gap between logical Western science and the intuitive science of the Orient. It makes it possible to present the same phenomenon in different languages, in different systems, and to look at the same phenomenon from different points of view.*

If you are familiar with the principles of Traditional Chinese Medicine, if you accept the ideas of meridians, energy channels and energy fields, then the EPI

method is for you – particularly since the concept of electropuncture is already well integrated into modern Western medicine. The theory of biological fields recently had its sixtieth birthday [Gurvich, 1944]. If you feel close to the ideas of Ayurvedic medicine, you can successfully use the *EPI Chakra* program which carries additional information in comparison to the other programs. And in any language it is possible to speak of energy measurements and of the energy potential of organs and systems. The concepts set out above provide these ideas with modern Western analogies and connect them to the current scientific paradigm. We hope that the data obtained through the EPI method broadens that paradigm, giving it new content and a new language.

Part V

Environment Scan and Remote Detecting of Human Emotions

Environment scan is designed to record time dynamic of different processes using Bio-Well with connected supplements:

Sputnik sensor;

Water electrode;

Bio-Well instrument with "Sputnik" antenna allows you to monitor time dynamics of the Energy of the Environment. This may be interesting for several aims:

Testing different places looking for places with calm and turbulent energy.

Testing Energy situation in different places depending on the position of sun, moon, time of the year, etc.

Measuring energy in the Places of Power – both natural and man-made – temples, sacred places, ancient cities, etc.

Testing Geoactive Zones, in particular, Geopathic Stress Zones.

Detecting the influence of emotions and focused attention to the environment.

The procedure should be as follows.

Insert Ti cylinder holder into Bio-Well window, position Bio-Well on a special stand and connect wire to the grounding jack.

Test the image in the Full Scan mode. It should look like a ring. In case of distorted images pull and position the red jack at the Ti cylinder holder.

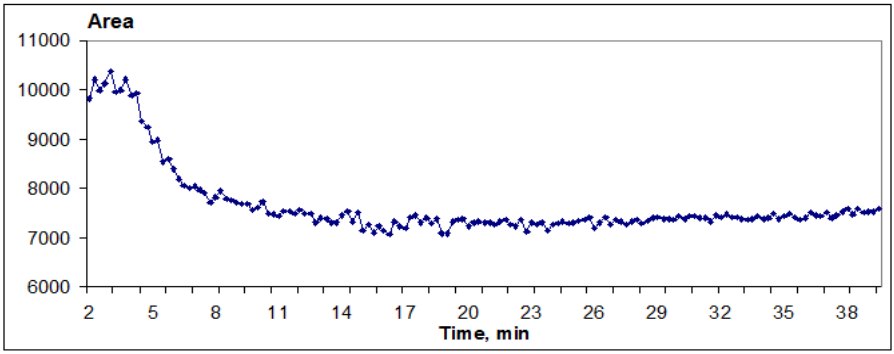
Connect Sputnik to the Ti cylinder holder.

Press “Start” button. It takes 3 minutes until the line of the graph stabilizes at some level.

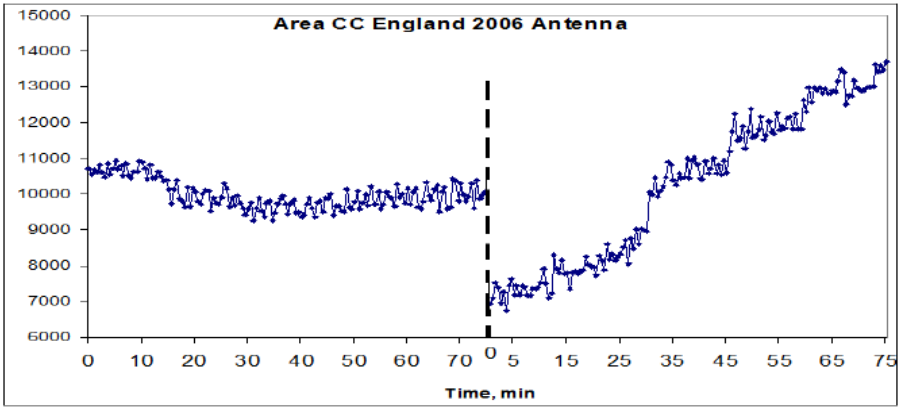
It is well known that people fell differently depending on environmental situation. In some places you sleep as a baby and wake up full of energy; in other places you have wonderful dreams and travel in beautiful places while you sleep. However, already since thousands of years, the existence of specific locations where people do not sleep well, get sick more easily, or where performance is lower has been empirically known. What is the difference between all these places? Very little is known in Western science. It is clear that combinations of different causes compose the phenomenon. This is a combination of the influence from the Earth – underground anomalies, hollows, water streams; gases in the atmosphere, both natural and industrial; electromagnetic background; and the influence from the Universe, Sun, Moon and Cosmic rays. Now it is practically impossible to distinguish between all these factors, so we need a common denominator to evaluate the overall situation in the particular place. Only rudimental evidence is available today, if such zones could be measured using accepted physical apparatus.

Bio-Well instrument gives you such an opportunity. Many years of research confirmed the idea that it allows to evaluate the Energy situation in the environment. Expeditions to different parts of the world: Peru, Colombia, India, Myanmar, Siberia, and many others demonstrated sensitivity of the instrument for evaluating environment. Scientific background has been developed and published in per-review journals, patents have been granted in several countries, and now this instrument has become available for public use.

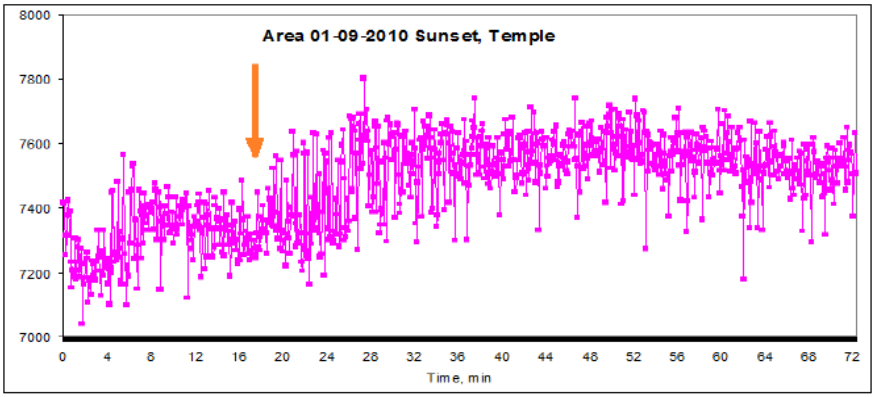
You need to take measurement for at least 30 min; the maximum time is not limited. In a calm, peaceful environment, after initial setting for about 5-15 minutes signal becomes quite stable (see the graph below).



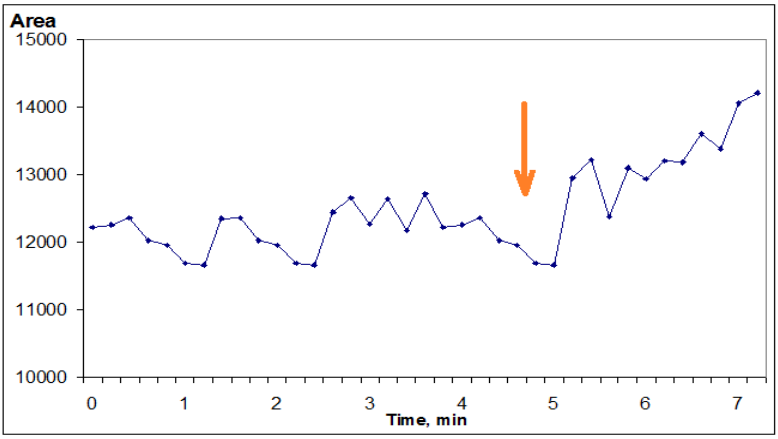
In the Geoactive zone variations of the energy may be very high. Graph below demonstrate the energy variation outside and inside the crop circle in England in summer 2006. As you see, outside the crop circle energy was quite stable, while inside it was increasing during all the time of measurement.



Same way you may detect the change of energy during sunrise and sunset (see graph below), or coming sunder storm. In parallel, you can measure transformation of the Human Energy Field – of yourself and other people. This way you will see you own reaction to the changes in environment.



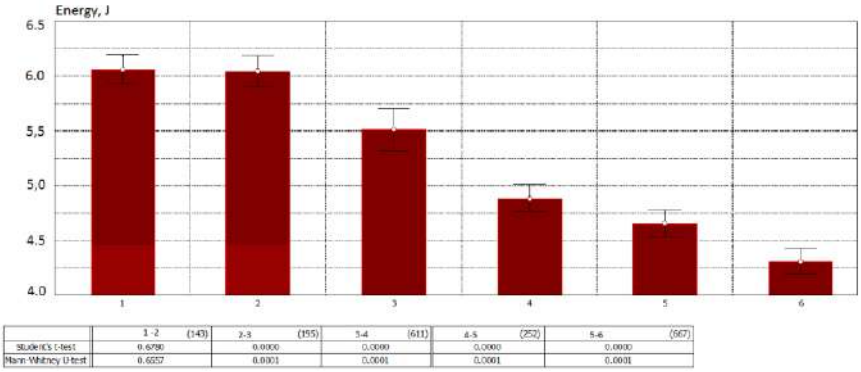
Another example demonstrates the influence of concentrated human attention to the signal of the "Sputnik" sensor. At the graph below arrow denotes the moment when a person concentrated her intention on the sensor sending love. As you see, this reflected in significant increase of the graph. This experiment was repeated many times and in most cases in case of real concentration, effect was significant.



Measurements conducted during religious ceremonies, yoga meditations, public lectures, musical performances demonstrated that the signal of the Sensor statistically significantly changes during measurements and these changes are correlated with the course of event.

Every 5 seconds Bio-Well software measures time-line of several parameters and their Standard Deviation from the Sensor. To evaluate these changes you need to process data. After recording is finished press "Stop" and then "Statistics" button and put benchmarks for the significant moments of the session (beginning of presentation, breaks, beginning and end of meditation, etc). Program calculates parameters for every marked interval and evaluates statistical difference between intervals. Data are presented as different parameters.

An example of time dynamics of sensor parameters.



	1-2 (143)	2-3 (155)	3-4 (611)	4-5 (252)	5-6 (967)
Student's t-test	0.6790	0.0000	0.0000	0.0000	0.0000
Mann-Whitney U-test	0.6557	0.0001	0.0001	0.0001	0.0001

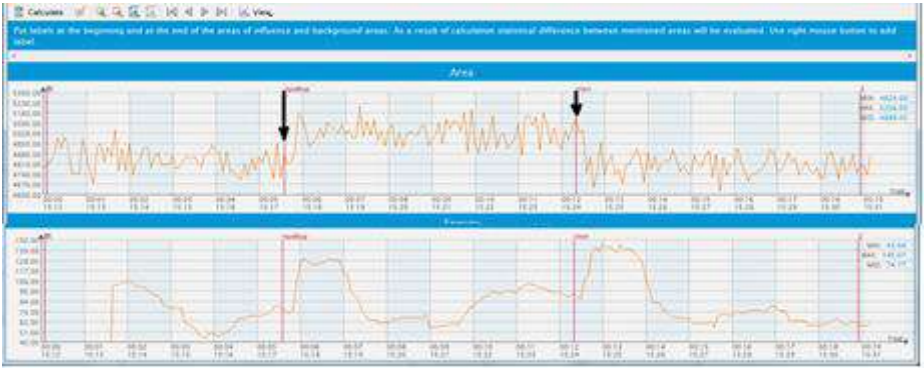
Statistical processing of data collected during 3 h 30 min. Intervals: 1 – beginning; 2 – Joe Dispensa starts presentation; 3 – Joe presents; 4 - break; 5.6 – meditation. Results of statistical processing are presented under the graph. Two intervals are different if $p < 0.05$. Numbers in brackets indicate the number of experimental points in the particular interval (readings are taken every 5 seconds).

Testing Water with Bio-Well

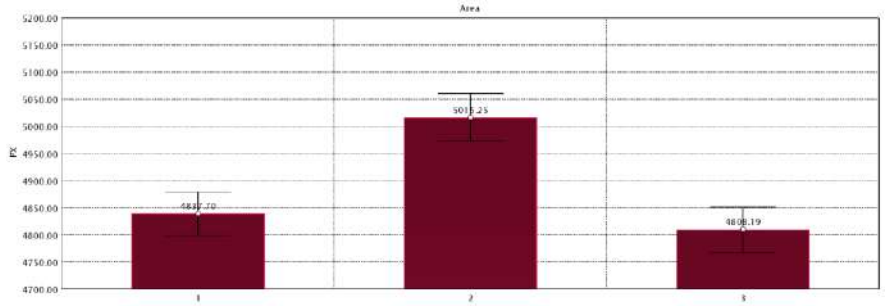
Insert standard Pt water electrode into water or other liquid and connect it to the Ti cylinder.

Take dynamic readings of water as described above. Analyze time dynamic process of water and see its intercommunication with environment.

When water dynamics becomes stable, you may check the influence to water from different devices and human intention. See example below.



Example of water dynamics with the influence from imprinted device (marked by arrows).



1	2	3
2 (05:39)	прибор (06:45)	стол (06:35)

	2/Start (66)	прибор/2 (81)	стол/прибор (79)
Student's t-test	0.0000	0.0000	0.0000
Mann-Whitney U-test	0.0001	0.0001	0.0001

Statistical processing of the above graphs.

Non-local consciousness influence to physical sensors

Introduction

The problem of Non-Local Consciousness Influence (NLCI) to the physical world has been widely discussed in popular and scientific literature. A lot of anecdotic cases have been reported, from which the most interesting were the cases of influence to electronic and computer systems [Radin D., 1997]. A number of experiments have been conducted in controlled experimental conditions [Schwartz G., Simon W. 2007]. By the end of the XX century conceptual basis for NLCI was being created by the new scientific branch related to Quantum Entanglement, Quantum Teleportation and Non-Local Realism [Radin D., 2006].

Experimental Results

Several experimental modalities have been developed with GDV instruments: 1) Directed NLCI of a person; 2) Directed NLCI of a group of people; 3) Non-Directed NLCI of a group of people.

In the first mode, we experimented with several people from Russia, Germany and USA involved in professional healing. After several trials, observing the real-time reactions of the instrument in the biofeedback mode, they tried to send NLCI from the distance. All the experiments were conducted in twin-blind regime recording signal for three hours, during which time healer, at the time of his choice, was trying to influence the sensor for 10 minutes. In some experiments, a second similar sensor was used as a control. 16 controlled studies have been conducted from Berlin, Tokyo and Moscow to Saint Petersburg. In 12 cases, statistically significant results of NLCI were recorded. Let us present some examples.

In agreed days, five plastic 1-liter bottles of tap water were placed at 10 a.m. at the table in the experimental room of Saint-Petersburg University. Every bottle was labeled with color strip. Bottles were left intact till 4-5 p.m. when GDV measurements of water samples from every bottle were undertaken.

German healer Christos Drossinakis performed mental influence within four days (from eight agreed days) at 12 a.m. for 10 min to two bottles from Japan and Germany. Researchers performing measurements were unaware neither of the

influence performed no of the target bottle. In two days significant changes in GDV parameters of water drops between samples from different bottles were found. It was days of Drossinakis' influence from Japan. In other six days no significant reproducible difference between samples was found.

Fig. 1 demonstrates dynamical curves measured on April 09, 2002. As we see from the graphs, behavior of curves from the bottles NN 1 and 2 are clearly different from three other samples: curve N 1 exponentially increases in time, and curve N 2 has much higher level of variation compared with other samples.

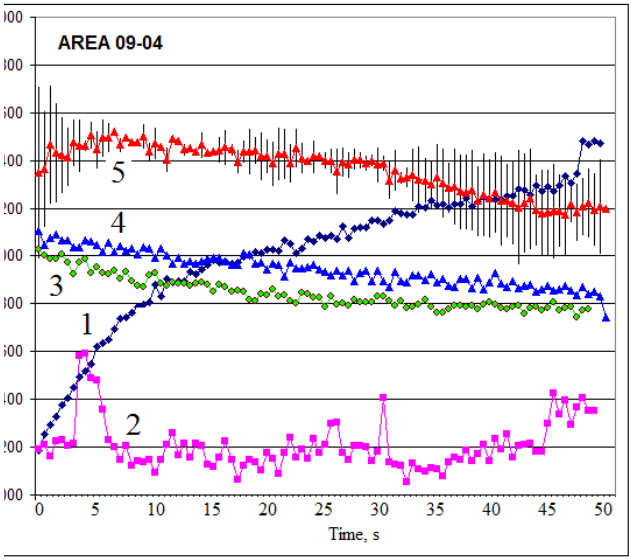


Fig.1. Time Dynamics of the area of EPI glow for water drops from 5 different bottles measured on the April 09 and April 10, 2002. Every curve is averaged on 5 subsequent measurements. Vertical bars at the upper curve demonstrate the typical level of variation.

Influence of healer Alexey Nikitin from the distance 2-5 meters resulted in transformation of relatively stable water dynamics into chaotic oscillations (fig.2), very similar effect was found under the influence of Valerii Sochevanov (fig.3).

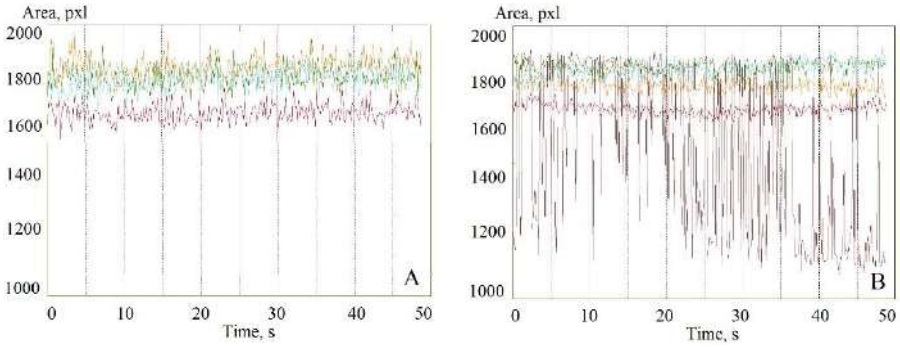


Fig.2. Time Dynamics of the area of EPI glow for 3 water samples before (A) and in the process of distance influence (B).

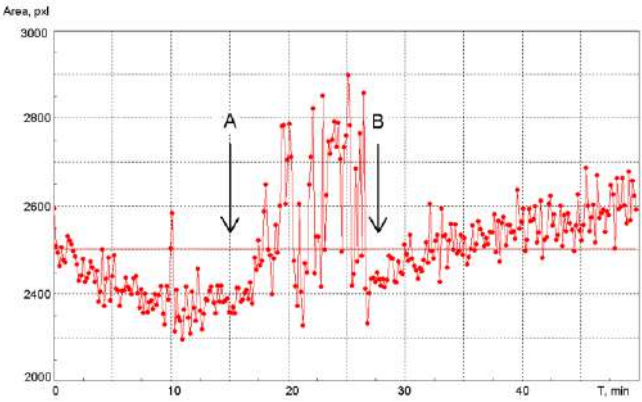


Fig.3. Time line of Area for water under the influence of V.Sochevanov. A-B the moment of influence.

Directed NLCI of a group of experienced meditators was tested during several workshops in Europe and USA. People were asked to meditate and send their positive emotions to the sensor being positioned in the same room. In all cases statistically significant changes of signal were recorded (see example at fig.4).

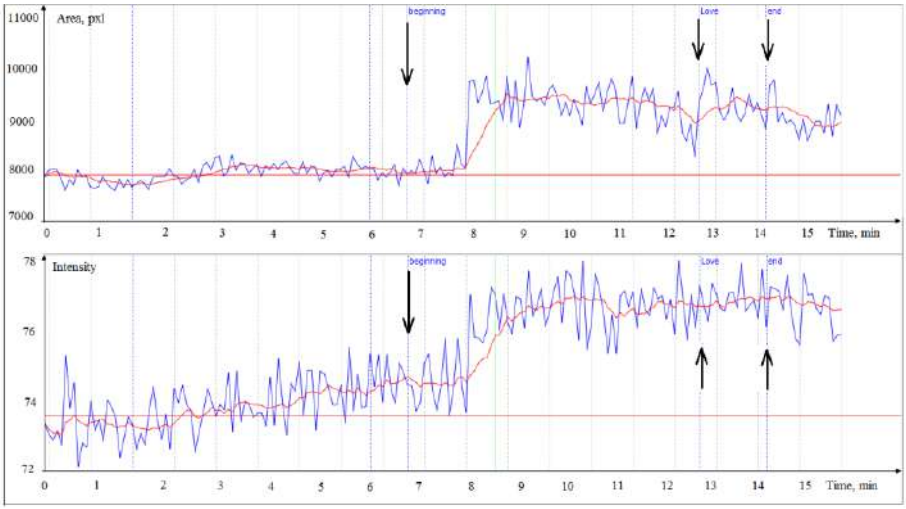


Fig.4. "Sputnik" sensor recordings 2011-05-07. At the graphs: "beginning" the moment of beginning of collective meditation; "Love" – sending love to the world. Upper graph – Area, lower graph – Intensity of a signal.

A series of 5 experiments with remote intention influence was conducted together with Lynne McTaggart in 2007-2010. Lynne organized big groups of people by Internet (http://theintentionexperiment.com). People were able to see the photo of the experimental setup and start their meditation at the agreed time (marked by arrow at the graph). People were not given any special instructions on the way of meditation. Data were recorded in automatic mode, about 1 hour before the intention time and 1 hour after. Control experimental setup was set in adjusted room. First experiment in 2007 allowed to check and correct all the procedure of the experiment, and in 2008-2010 recorded responses both of water installation and sendor were statistically significant. Fig. 5 presents an example of experimental data and in Table 1 an example of the results of statistical analysis of the data (samples are considered statistically significantly different if $p < 0.05$).

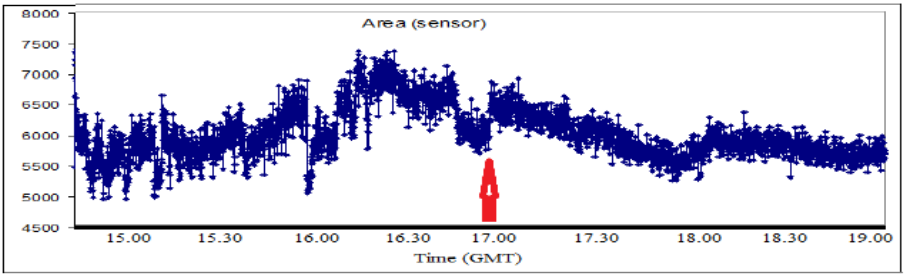


Fig.5. Time Dynamics of the area of the sensor signal before, in the process and after the distance influence 2010-12-06.

Table 1. Results of statistical analysis of collective NKCI. P value of the t-test.

t-test	Area	Intensity	Form coeff	Radius of isoline
before/intention	0.0000	0.2917	0.0002	0.0000
before/after	0.0000	0.1805	0.0000	0.0000
10"before/after	0.0000	0.0152	0.0211	0.0001
10"before/intention	0.0001	0.0296	0.1228	0.0008
intention/after	0.4244	0.8458	0.5498	0.6222

Analysis of data demonstrated, that in all cases of collective distance directed NLCI of big groups of people from all over the world statistically significant response of water and sensor was recorded. In many cases sensor responded 10-15 minutes before the agreed time, which may be explained by human thoughts of the upcoming event. Control samples demonstrated some variation of parameters but not significant in most cases.

A big series of experiments with Electrophotonic Sensor was conducted during workshops and conferences of the Reconnection Healing (www.thereconnectionhealing.com) in 2008-2011: 6 during conferences and 13 during workshops. Sensor was set in the conference room and operated for several hours. At all sessions Sensor responded to significant events in the room, in most cases during presentations of Dr. Erick Pearl, at the same time behavior of the graphs was different in different sessions.

From the experiments it was clear that recorded variations of a Sensor was related both to the activity of the presenter and to the reaction of the audience. From all the data the conclusion was made that during sessions of Reconnection Healing structurization of a space in the auditorium took place. The physical background of this effect needs attention and further investigation. Example of experimental data are presented on fig. 6.

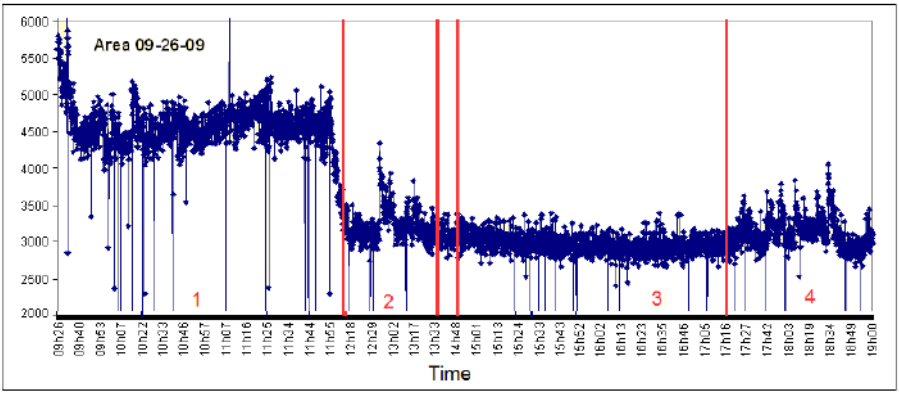


Fig.6. Time variations of Area recorded by "Sputnik" sensor during Reconnection Healing Workshop 26 September 2009.

Time sequence of activity :

1	0926 – 1215	Introduction session
2	1216 – 1335	Dr Eric Pearl arrives, jokes & opens Q & A to floor while affirming permanence of RC process.
	1336 - 1447	Lunch while healng sessions are in process.
3	1448 – 1651	Session is in process.
	1650 - 1715	Recess
4	1716 – 1903	Eric continues to instruct & guide to focus on observable prompts. Session concludes 1757

We may define the following moments of sensor' reactions:

- Area graphs had both ascending and descending response.
- Area variations were from 11% to 100% in different sessions.

- In 11 cases from 19 Intensity increased during session, while other parameters demonstrated different behaviour.
- Recording lasted from 1h40 to 10h30. The level of variations did not depend on the length of a session.
- During the conferences, only some presenters stimulated the reaction of the sensor.

Control recordings in the laboratory without presence of people demonstrated variations of Area and Intensity at the level 3-7% without any specific moments.

Measurements taken with two independed sensors in parallel demonstrated very high consistency in recording significant events during workshop.

At the Reconnective Healing Workshop in Los Angeles in September 2008 consistent effects were recorded by the teams led by Dr. W. Tiller and Dr. G. Schwartz with the equipment operated at absolutely different principles. These results are discussed in the book "**Science Confirms Reconnective Healing**" (Korotkov K editor), available from www.Amazon.com.

Very special application of the Electrophotonic Sensor was found measuring influence of music to space, listeners and performers. Here we give an example. 11-14-2009 in Brugge, Belgium a very special concert was organized by a famous singer Ingeborg Sergeant. During presentation singers from different nations presented their songs. Dr Masaro Emoto took part in the performance as well. As we see from the fig. 7 at the moments of singing parameters of sensor signal were significally different from the parameters in intermissions. We may even say that performance of spiritual singers change the entropy of space.

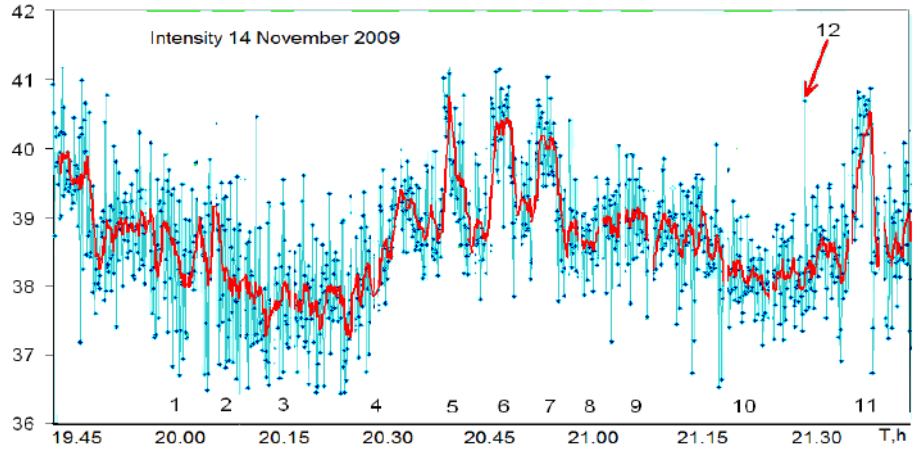


Fig.7. Time dynamics of Intensity during performance. Solid line – line filtration approximation. Marked moments: 1 - Beginning of Ingeborg and Emoto presentation; 2 - Song; 3 - Song; 4 - Song "Shabat - Shalom" ; 5 - Song "Besmilla"; 6 - Song "God is Great"; 7 - Song "OM – Shri"; 8 - Lyric song ; 9 - Child song; 10 - Song "Gati-Gati-Paragati"; 11 - Song "Kumbaja My Lord"; 12 - Emoto singing.

Discussion

Instrumental approach developed for recording NLCI have been proven during 5 years in a series of experiments conducted by research groups in Russia, Germany, Ukraine and Chili. Collected data give us clear evidence that human consciousness may influence parameters of physical systems, both intentionally and non-intentionally.

From the conventional point of view, we may state that bias current in the electrical chain depends on the capacitance of space between antenna and environmental grounded and electroconductive subjects. Emotions are related to the activity of the parasympathetic division of the autonomic nervous system, which changes blood microcirculation, perspiration, sweating, and other functions of the body, resulting in the changes of the overall conductivity of the body and the conductivity of acupuncture points in particular. So the presence in the vicinity of the instrument of the emotional people may change the conductivity of space and, hence, the signal of the sensor. This may be related to the formation of areas of decreased entropy in space, or, as prof. Tiller claims

"associated with the buildup of a negative magnetic charge manifesting in the environment". Some quantum effects may be involved as well.

We may construct several models explaining observed effects – from chemical and physical ones to quantum electrodynamics and esoteric. From our point of view, this is not important at the moment. First of all, we need to collect a big database of observations in different situations by several research groups. At any rate, without being concerned on physical explanations, it is clear that the effects of Non-Local Consciousness Influence to physical sensors are measurable and reproducible. This allows devising a line of experimental exploration of these effects. It may have a strong implication to our understanding of physical reality and the role of consciousness in the world. Measurements may be done in a theater, concert hall, church, lecture auditorium. It is interesting to take measurements during sport event. However, for one single group it is difficult having many different experiments, we need collective efforts of researches from different countries. The advantage of this approach is that any researcher operating with the Bio-Wel Camera may take part in research.

We should take into consideration the following ideas of prof. Tiller [2009]:

"The periods of audience-focused attention upon the on-stage speaker signals that group entrainment leading to significant growth of group coherence is occurring. This leads to high information production rate events,

Macroscopic spatial information entanglement due to simultaneous use of multiple measuring instruments appear to be generating reduced contrast in the magnitudes of various event signatures. This probably occurs via the addition of out-of-phase vector components (a type of data randomization)

As a closing remark, if all the subsystems of the experiment are included in the analysis, it certainly strengthens the statement regarding "only trends" from our experimental measurements can be expected to be meaningful at this time. Further, with Dr. Korotkov's team making experimental measurements in the same room as us, one should expect information entanglement to occur between their measurement system and ours"!

To prove or disapprove these ideas we need to have a series of further experiments with different modalities of healing.

At any rate, without being concerned on physical explanations, it is clear that the effects of human emotions are strong and measurable. We may definitely tell about conditioning of environmental space in the workshop room. In the further stages of experiments we need to study the following topics:

- Correlation between several similar instruments installed in the same room of the workshop and in different rooms. It will help us to answer the question of space conditioning and the area of the influence.
- Comparison with effects of a group of people at the music concert, political gathering.
- Effect of age and gender of participants.
- Influence of geophysical conditions.
- Dependence of effects on the experience, training and other qualities of practitioners.

Correlation of results between Dr. Tiller and Dr. Korotkov teams makes them especially significant and opens perspectives for further understanding of the enigmas of consciousness.

Results allowed to start a new scientific line of the instrumental investigation of the geoactive zones. In this field culturological aspect of the problem is of particular interest. Idea that from the ancient times historical monuments have been correlated with the "places of power", areas, having some specific geophysical properties, specific influence to the human condition, has been experimentally approved.

The perspectives of study are exciting for everybody interested in the spiritual history of humankind. We may define the whole new international research line: development of the maps of energy parameters of sacral subjects and the program of study of their influence to the human psycho physiological condition, in relation with the environmental situation, health and psycho-type of people. This type of research may be a public domain, contrary to the archeological excavations, they do not need any official allowance, and results may be exchanged and published through the Internet. This approach opens up a broad field of activity. Not just sun-bathing at the beach or wandering around with photo camera, but participating in the international project on the development of Geoactive Zones Database. The only condition for this – is ability to operate with Bio-Well Camera.

Part VI

Different Research Lines

Electrophotonic Analysis of Arterial Hypertension

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3 National Research University of Informational Technologies, Mechanics and Optics, Saint Petersburg, Russia.

Introduction

Arterial hypertension (AH) is the most common chronic disease in the world and one of the most serious medico-social problems. 30% of adult population of industrial countries present with elevated degree of arterial pressure and only 12-15% of population having stable arterial hypertension. The disease is a common cause of life-endangering acute heart (myocardial infarction) and brain (cerebral stroke) diseases including people of the working age. About 50% of all fatal cases from cardio-vascular diseases fall on arterial hypertension. It is the underlying cause of numerous chronic diseases of the heart, brain, kidneys, eyes and other so-called target organs.

Even today, when doctors have sufficient number of potent antihypertensive at their disposal average life span of the patients with arterial hypertension is not high. Arterial pressure often elevates among adolescents, the disease dramatically getting younger along with most cardiovascular diseases. Hypertension and atherosclerosis are turning into important cause of premature death.

There is no doubt that prophylaxis and treatment of arterial hypertension are most effective at its early stages and not at the chronic stage with organic changes. It is disappointing that in many cases the onset of the disease stays unseen as early rises in arterial pressure (AP) are not always associated with subjective symptoms which makes arterial hypertension a disease difficult to diagnose at the early stages. Therefore, the early diagnostics of arterial hypertension and a special program of its further development prevention present an important scientific and practical problem. The focus today is on methods allowing detecting early changes characteristic for arterial hypertension. Public health service needs highly sensitive non-invasive screening tests for AH.

Thus, the objective of the given study was evaluation of GDV potential for detecting patients with different degrees of severity of arterial hypertension in the course of population screening.

Several classifications of arterial hypertension are accepted in medicine. To date, according to UHO recommendations arterial hypertension is classified into 3 degrees (depending on the degree of AP elevation) and 3 stages (depending on the involvement of target organs). There are also 4 categories of arterial hypertension depending on the likelihood of cardio-vascular complications in the nearest 10 years. The complications are related to the presence of the risk-factors, involvement of target organs and/or concomitant (associated) diseases.

The study was aimed at:

- Calculating discriminative functions to detect patients with different degrees and stages of arterial hypertension as well as the risk of cardio-vascular complications;
- Assessing dependence of the most qualitative patient grouping on one of the recognized AH classifications.
- Assessing the influence of patients' gender on calculation discriminative functions.
- Building the model of logistic regression to detect patients with different degrees of AH severity.

Materials and methods

603 patients aged from 18 to 83, 265 males and 338 females served as participants. All were divided into groups according to AH degree and stage and degree of cardio-vascular complications risk in the nearest 10 years. Groups were divided as follows:

Control group – 136 people (47 men and 89 women) and experimental group – 467 people (218 men and 249 women).

Experimental group was in its turn divided in different ways:

According to the degree of AH: AH1 of the 1st degree – 92 persons (38 men and 54 women); AH2 of the 2nd degree – 185 people (89 men and 96 women); AH3 of the 3d degree – 190 people (91 men and 99 women).

According to the AH stage: AH1 of the 1st stage – 103 people (40 men and 63 women); AH2 of the 2nd stage – 283 people (130 men and 153 women); AH3 of the 3d stage – 81 persons (48 men and 33 women).

According to the likely risk of cardio-vascular complications: low risk (risk 1) – 56 people (24 men and 32 women); moderate risk (risk 2) – 88 people (33 men and 55 women); high risk (risk 3) – 114 people (51 men and 63 women); extremely high risk (risk 4) – 209 people (110 men and 99 women).

In the course of the study, the following BIO-gram parameters were analyzed: image area, normalized area, intensity, spectrum width, brightness and fractality. According to these parameters, we analyzed images of all 10 fingers as a whole as well as of separate sectors selected in accordance with Korotkov's Diagnostic Table: cerebral cortex, cerebral vessels, the right and left heart, vascular system, coronary vessels, hypophysis, hypothalamus, epiphysis, thyroid, suprarenals, kidneys, the nervous system.

While using different diagnostic methods, one should know how reliable it is, taking into account its specificity and sensitivity for practical evaluation of different health problems.

Specificity implies the share of healthy people found healthy in the course of diagnostics from the total number of healthy.

Sensitivity implies the share of ill patients found ill in the course of diagnostics from the total number of ill patients.

Results and discussion

Results of GDV measurements have been analysed using ANOVA statistics and discriminative analysis. The first stage of the work included step by step discriminative analysis of GDV parameters between the control group and each of the three groups of arterial hypertension (according to degree of severity) separately. Results are presented in Table 1. The given figures are the result of cross-testing.

Table 1. Grouping according to degree of AH. Results for all patients.

AH degree	Specificity	Sensitivity
AH1	67,6 %	62,0%
AH2	68,4%	66,5%
AH3	72,8%	77,9%

As an example, we present discriminative function between the control group and the group of the 1st degree of severity AH1. 8 parameters were included into the obtained discriminative function, among them were spectrum width of the images of the right thumb, sector of the head (cortex and vessels), suprarenals, thyroid and kidneys. Discriminative function between the control group and diagnosed AH1 group looks as follows:

D = 0.017*X1+5.538*X2-0.476*X3+0.426*X4+0.001*X5-1.720*X6
+4.171*X7 +4.595*X8 -8.979

If X1, X2 etc are the values of measured parameters for the particular person, the tested patient either with 67.6% accuracy is being referred to the group of healthy, or with 62.0 % accuracy having the 1st degree of arterial hypertension and should undergo an additional testing.

From stage to stage of arterial hypertension the number of diagnostic parameters increases from 8 up to 19, which is understandable as it coincides which the

degree of involvement of target-organs. All group proved to have the following sectors in common: cerebral cortex, thyroid and kidneys and starting with Group 2 (diagnosed AH2 of the 2nd degree) – the heart sector. Specificity and sensitivity increased along with higher degree of arterial hypertension.

It is known that GDV parameters are dependent of the patient's gender and arterial hypertension takes a different course in males and females. Discriminative functions were calculated for all three degrees of arterial hypertension for males and females separately (Table 2).

Table 2. Grouping according to AH degree. Results for males and females.

AH degree	Females		Males	
	Specificity	Sensitivity	Specificity	Sensitivity
AH1	76,4%	77,8%	80,9%	73,7%
AH2	74,2%	81,3%	63,8%	70,8%
AH3	75,3%	74,7%	78,7%	80,2%

Common diagnostic parameters were found for all groups, they included sectors of the cerebral cortex, vascular system, heart, thyroid and kidneys. Specificity and sensitivity of the functions obtained in groups divided on the basis of patients' gender were 5-9 % higher than for the mixed group.

The number of diagnostic parameters used and percentage of difference for females with AH1 and AH2 were found higher than that for males. Men are known to have a tendency for higher arterial pressure against women of reproductive age. Differences on AP between men and women disappear after women's menopause or ovarioectomy. AH incidence is lower in women below 60 and higher over 60 against men of similar age.

The next stage of the investigation was comparison of data obtained for patients of the control group and groups with different stages of arterial hypertension.

Specificity and sensitivity values of calculated discriminative functions increased from the first stage of arterial hypertension to the third. Increase in specificity from stage to stage amounted to 67-80 %, and sensitivity – to 70-77%. The number of diagnostic parameters increased from stage 1 to stage 3 from 7 to 22. For all stages, sectors of the cerebral cortex, heart, suprarenals and thyroid were involved in calculation.

Table 3. Grouping according to AH stages. Results for the whole group.

AH stage	Specificity	Sensitivity
Ahs1	66,9 %	70,9%
Ahs2	67,6%	73,5%
AHs3	80,1%	76,5%

Discriminative functions were also calculated for men and women separately (Table 4).

Table 4. Grouping according to AH stages. Results for males and females.

AH stage	Females		males	
	Specificity	Sensitivity	Specificity	Sensitivity
Ahs1	80,9%	64,1%	80,9%	79,5%
Ahs2	68,1%	81,3%	75,3%	75,8%
AHs3	72,3%	67,3%	83,1%	84,4%

For this classification mean percentage of correct placements for men exceeded the one for women by 6-8%. It is likely to be associated with specific involvement of target organs for men and women.

Arterial hypertension is one of the main risk factors of cardiovascular diseases in women. Though the level of arterial pressure for women of the premenopause period is lower then for men of the corresponding age, AH incidence for elderly women is higher.

To sum it up, the course of arterial hypertension for women of the postmenopause period has the following characteristics:

- the disease is frequently manifested in perimenopause period (from the onset of initial climacteric symptoms to one year after the least menstruation);

- higher sensitivity to table salt;
- low-renin forms of arterial hypertension;
- narrower diameter of the aorta;
- characteristic rise in systolic arterial pressure;
- high rate of heart contractions;
- menopause associated with increase in cardiovascular response induced by stress and rise in arterial pressure registered during 24-hour monitoring of arterial pressure;
- more frequent involvement of target organs;
- more frequent hypertrophy of the left ventricle mostly of the concentric type;
- more frequent complications.

Elevated arterial pressure and higher incidence of arterial hypertension in postmenopause are believed to result from other factors as well e.g. increase in the volume of circulating blood, higher body mass and higher noradrenalin level in the blood.

Discriminative functions were calculated to detect patients with different risk of cardio-vascular complications after arterial hypertension. Specificity and sensitivity of calculated functions amounted to 64 – 73.5% and 62.2 – 76% respectively which correlates with values for the groups classified on the basis of AH degree of severity. The number of diagnostic parameters increased depending on the risk group. Sectors reflecting the heart and kidneys were found as the most common for all groups (Tables 5, 6).

Table 5. Grouping according to the risk of cardio-vascular complications. Results for the mixed group.

Risk of cardio-vascular complications	Specificity	Sensitivity
Risk 1	73,5 %	62,5%
Risk 2	69,9%	72,7%

Risk 3	64,0%	64,0%
Risk 4	69,9%	76,1%

Table 6. Grouping according to the risk of cardio-vascular complications. Results for males and females.

Risk of cardio-vascular complications	Females		males	
	Specificity	Sensitivity	Specificity	Sensitivity
Risk 1	82,0%	75,0%	76,6%	58,3%
Risk 2	78,7%	74,5%	70,2%	66,7%
Risk 3	74,2%	77,8%	74,5%	78,4%
Risk 4	76,4%	75,8%	68,1%	72,7%

Feasibility of detecting patients with different AH degrees was tested with the help of logistic regression. Specificity and sensitivity were found close in values to those obtained by discriminative analysis but values of specificity calculated by logistic regression were somewhat lower than those calculated by discriminative analysis which determined our choice of the latter in our investigations (Table 7).

Table 7. Grouping according to AH degrees. Results calculated by logistic regression.

AH degree	Specificity	sensitivity
AH1	79,4 %	70,6%
AH2	68,3%	61,0%
AH3	58,1%	83,7%

Our findings correlate well with those obtained earlier by other investigators with the help of neuron network method as well as during comparison of the diagnosis

made with the help of GDV and other diagnostic methods widely used in modern medicine.

Conclusions

Discriminative functions were calculated to detect patients with various degrees, stages and risk of cardio-vascular complications in case of arterial hypertension. The number of diagnostic parameters increased with higher degree of AH manifestation from 8 to 22 while specificity and sensitivity of calculated functions made up about 70%

Sectors of cerebral cortex, heart, thyroid, suprarenals and kidneys proved to be the most frequent diagnostic parameters. We believe that patients' grouping was most qualitative under classification according to AH stages, which may be explained by the fact that in grouping according to AH stages both degree of AP elevation and involvement of target organs were taken into account. Classification according to patients' gender increased the accuracy of diagnostics by 5-9% which was due to differences in development and course of arterial hypertension in women and men.

Thus, reliable differences between the control group of healthy patients and groups with various AH degrees and stages were calculated with sufficiently high degree of accuracy which allows to include Electrophotonic - Gas Discharge Visualization technique into the population screening.

Express-evaluation of the psycho-physiological condition of the Paralympic athletes

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Introduction

Monitoring of athletes' activity for a long time allows creating the optimal training process and preparing athletes for completions in the peak of their adaptation, physical and psychological readiness [Drozdovski et al, 2012]. The best indication of this approach was successful performance of the Skiing and Biathlon Paralympic Team of Russia at Paralympic Winter Games Sochi-2014. Athletes on Russian Paralympic Team achieved commendable results in biathlon: Gold – 7, Silver – 5, Bronze – 3, as well as in skiing: Gold – 10, Silver – 3, Bronze - 6. These are remarkable results, which was achieved by combining efforts of coachers, psychologists and scientists.

This paper presents results of testing several instruments for express-evaluation of athletes' level of preparation in the training and competition periods and developing most efficient parameters for the practical applications.

Methods

The following methods and corresponding hand-held devices for athletes' express-analysis were used in the study:

1. Evaluation of the psycho-emotional tension (PET) by measuring Galvanic Skin Response with "Mirage" device; measuring electrodes were fixed on the pads of the index and ring fingers.
2. Evaluation of energy potential (EP) and stress level (SL) by the innovative Russian system: Gas Discharge Visualization technique. Measurements were taken from all 10 fingers.

Energy Potential (EP) is a measure of psycho-physiological condition of an

athlete; it is calculated in percents from 0 to 100%. EP = 100% is correlated with high level of competition readiness and high energy reserve.

Stress Level (SL) is characteristic of the level of anxiety and stress, measured on the scale from 0 to 10, where 10 is a maximum stress level. Interpretation criteria are given in Table 1.

Participants

Study was conducted at the training camp and in the process of the World Cup competitions in Norway from November 16 to December 18, 2011. 18 athletes of the Paralympic team of Russia on ski races and biathlon with damage to the musculoskeletal system were tested: 4 women and 14 men; 9 athletes of top level, age 32.5+/- 8, (LW5/7, LW6, LW8, LW10, LW12 in accordance with International Paralympic Committee classification), 6 athletes of middle level, age 24+/- 5 (LW2, LW12) and 3 preparatory level, 17 years old (LW8). Athletes were measured every day in the morning before breakfast. In the process of study 204 measurements in the training camp and 189 measurements before and in the process of the World Cup have been performed. All athletes participated in the study voluntary and with great interest; ethical considerations were taken into account.

At the World Cup 2011 Russian Paralympic Team participated in this study had the following results: 6 medals in biathlon (3 gold, 1 silver and 2 bronze); 9 medals in skiing (5 gold and 4 silver); yang athletes took the 4th position which demonstrated their potential for further competitions.

Results

Averaged indexes of psycho-emotional tension, Energy Potential and Stress Level are presented at fig.1 and individual data at fig.2. Correlations between indexes and sport achievements at the World Cup competitions are presented in Tables 2-5.

Discussions

Data of fig.1 suggest the following: 1) in the process of training athletes quite well responded to training loading; 2) athletes were well prepared to the completions of the World Cup; 3) athletes were able to keep high level of Energy Potential and low Stress Level during the competitions, which suggest the adequate selection of the training modalities.

At the same time, as we see from fig.2, all athletes may be divided to three groups:

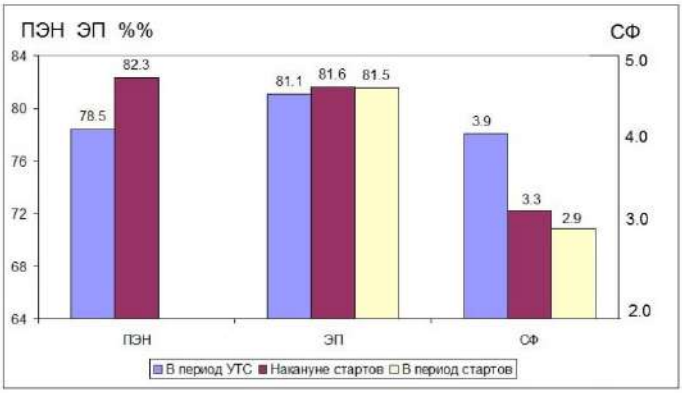

Fig.1. Averaged on the group parameters of athletes measured at the different moments: in the training camp; before the competition; at the moment of competitions.

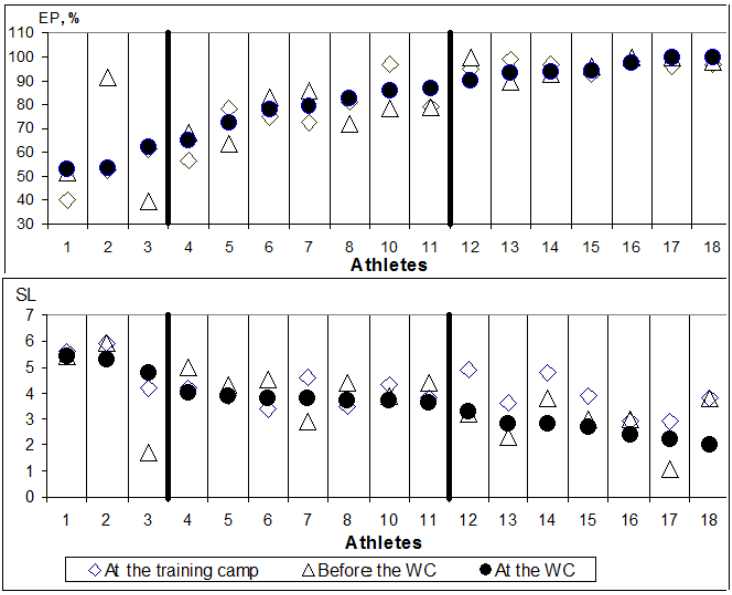

Fig.2. Energy Potential and Stress Level for individual athletes measured at the different moments: in the training camp; before the competition; at the moment of competitions.

- top-level athletes (NN 12-18 at fig.2) for them EP is very high and does not change much in all three sessions; stress level is the lowest at the moment of World competition, which suggest their high level of preparation;
- middle-level athletes (NN 4-11) for them EP is lower and SL is higher than for the top group;
- preparatory level athletes (NN 1-3) – low level of EP and high level of stress.

We need to point out that in the training camp athletes having low level of Energy Potential and high Stress Level had professional consultations of sport psychologist for optimization of their training process and psychological condition.

From the Table 2 we can make the following conclusions: 1) correlations between psycho-emotional tension and Energy Potential are non-significant; 2) strong positive correlations between Energy Potential in the training period, before ($R= 0.674$ $p<0,01$) and at moment of the World Cup ($R= 0.728$ $p<0,01$ and $R= 0.953$, $p<0,001$) were found.

From the Table 3 we may see the following strong positive correlations: 1) between psycho-emotional tension and Stress Level at the training camp ($R= 0.498$ $p<0.05$); between psycho-emotional tension at the training camp and Stress Level at the WC ($R= 0.491$ $p<0.01$); 2) between Stress Level at the training camp, Stress Level before the World Cup ($R= 0.541$ $p<0.05$) and Stress Level at the World Cup ($R= 0.688$ $p<0.01$ and $R= 0.554$ $p<0.05$).

From the Table 4 we may see the following strong correlations: 1) between Energy Potential at the training camp and Stress Level at the World Cup ($R=-0.622$ $p<0.01$); 2) between Energy Potential before the World Cup and Stress Level both before ($R=-0.620$ $p<0.01$) and at the World Cup ($R=-0.495$ $p<0.05$); between Energy Potential at the World Cup and Stress Level at the World Cup ($R=-0.699$ $p<0.01$). No correlations between Energy Potential and Stress Level at the training camp were found.

After studding correlations between indexes of psycho-physiological condition of athletes at the different stages of training and competition it is important to see

correlations between indexes and competition results. Main results are presented in Table 5.

From the Table 5 we see correlations of different levels between psycho-emotional tension, Stress Level and competition results, it is clear that they are all negative; no significant correlations with Energy Potential were found.

A direct measurement of Energy Potential and Stress Level in a fast non-invasive way is a quite new approach developed in Russian sport. It was tested for several years with teams of different level and sport types and demonstrated high efficiency and reliability. These parameters are very important in understanding athletes' level of preparation for competitions, as well as for the correction of training process in accordance with human organism condition and its response to loading. The process of measurements takes 1-2 minutes, it may be done at any place, even at the stadium; instruments may be run both from the power outlet and from the battery. This paper for the first time presents this approach to the clinical sport medical community.

Conclusions

The level of Energy Potential of an athlete created in the training period significantly influences the level of Energy Potential both before and at the time of important competitions. The level of Stress of an athlete recorded in the training period significantly correlates with the level of Stress both before and at the time of important competitions. Energy Potential and Stress Level have different level of correlations depending on the preparation period: at the training time no correlations were found, while before and at the competition time the level of correlations were highly significant. So the higher the level of Energy Potential achieved by the athlete in the training period, the lower the Stress Level in the competition time, which may contribute to the competition efficiency. The higher the Stress Level and Psycho-Emotional Tension in the training period, the lower the probability of high competition results.

Hand-held computer complexes "Mirage" and "GDV Sport" being used in this study allow to make express-analysis of psycho-physiological conditions of athletes with high precision at all the preparation and competition periods. Calculated parameters help to carry out corrective actions directed to optimization of the athletes' condition in the biofeedback regime.

Table 1. Interpretation criteria for Energy Potential (EP) and Stress Level (SL) indexes

EP	SL	Description of Condition
100%-80%	0-4	High level of psycho-physiological condition.
90%-80%	4-8	High level of psycho-physiological condition, emotional tension.
80%-60%	0-4	Affordable level of psycho-physiological condition.
80%-60%	4-8	Affordable level of psycho-physiological condition, emotional tension.
60%-40%	5-10	Acceptable level of psycho-physiological condition. Energy and emotional depletion is possible; risk of traumas; overtraining.
40%-0%	5-10	Energy and emotional depletion; high level of stress; risk of traumas; overtraining. Detailed medical analysis is needed.

Table 2. Correlations between Psycho-Emotional Tension (PET) and Energy Potential (EP) before and in the process of the World Cup (WC) competitions.

* - p<0.05; ** - p<0.01; *** - p<0.001.

Indexes	PET training camp	PET before the WC	EP training camp	EP before the WC	EP at the WC
PET at the training camp	X	0.377	0.024	0.307	0.013
PET before the WC		X	-0.291	-0.243	-0.366
EP at the training camp			X	0.674**	0.953***
EP before the WC				X	0.728**
EP at the WC					X

Table 3. Correlations between Psycho-Emotional Tension (PET) and Stress Level (SL) before and in the process of the World Cup (WC) competitions.

Indexes	PET training camp	PET before the WC	SL training camp	SL before the WC	SL at the WC
PET at the training camp	X	0.377	0.498*	0.064	0.491*
PET before the WC		X	0.353	0.054	0.425
SL at the training camp			X	0.541*	0.688**
SL before the WC				X	0.554*
SL at the WC					X

Table 4. Correlations between Energy Potential (EP) and Stress Level (SL) before and in the process of the World Cup (WC) competitions.

Indexes	SL at the training camp	SL before the WC	SL at the WC
EP at the training camp	-0.343	-0.290	-0.622**
EP before the WC	-0.204	-0.620**	-0.495*
EP at the WC	-0.273	-0.294	-0.699**

Table 5. Correlations between competition results and parameters of psycho-physiological condition before and in the process of the World Cup (WC) competitions (11 athletes took part in biathlon and 15 athletes in skiing).

Indexes of psycho-physiological condition	Results in the biathlon			
	10.12.11 Sprint	11.12.11 Pursuit	13.12.11 Long dist.	Total result
SL at the training camp	-0.407	-0.349	-0.465	-0.413
PET before the WC	-0.540	-0.446	-0.570	-0.531
	Results in skiing			
	15.12.11 Long dist.	17.12.11 Sprint	18.12.11 Middle dist.	Total result
SL at the training camp	-0.622*	-0.713**	-0.429	-0.707**
SL before the WC		-0.590*		
PET before the WC	-0.574*	-0.540*	-0.567*	-0.683**

Comparative Assessment of the Impact of Drinking Water Quality on the Athletes' Condition During Exercise

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Introduction

Water is the main component of the internal environment of an organism. For people whose work involves intense physical activity, the state of water-salt metabolism is an important physiological requirement for maintaining optimum performance. The Federal Service for Supervision of Consumer Rights Protection and Human Welfare notes the poor quality of drinking water in Russia. About 19% of samples from the water supply do not satisfy the sanitary-chemical standards and about 8% do not satisfy the bacteriological standards. Nationwide, up to 30% of the samples of surface water sources do not meet health standards for sanitary-chemical reasons, and up to 25% - for bacteriological reasons. A serious problem is posed by water distributing systems - between 40% and 70% of them are in need of replacement. According to a March 18, 2005 Service memo, "as a result of this, accidents at these systems and the subsequent microbial contamination of drinking water constitute an epidemic risk." The memo states that out of all the disease outbreaks reported in 2004, 77.3% were of an "AQUATIC" nature and were related to the poor state of the water system. As such, the quality of drinking water may, along with a number of other factors play a certain role in determining the effectiveness of human activity. This holds especially true for activities involving extreme exertion - in particular for sports. This study focuses on identifying the impact of specially prepared water on the organisms of athletes.

Organization and Methodology of the Study

Sample

The sample consisted of 40 athletes between the ages of 14 and 25, coming from the Olympic Reserve School (St. Petersburg). Their skill level ranged from first-class sportsmen (regional champions) to candidates for master of sport (nationally ranked players) and masters (national champions) in different kinds of sports - athletics, rowing, triathlon, basketball. Two 20-person groups were randomly selected - experimental and control. Groups were randomized by age, gender, skill level, and sports type. Subjects were aware of the goal of the experiment, but were not told which kind of water they would drink.

For 30 days athletes in the experimental group drank water passed through an HRCM graphene filter [1]. Athletes in the control group consumed bottled water.

Water source

The filtering process utilizes the high-reactivity carbon mix (HRCM) - a new carbon material (Parent RU №2163883, Patent US 7,842,271 B2 "Mass production of carbon nanostructures"). HRCM contains carbon nanostructures that have an enormous surface area (about 2000 m^2 per gram). As such, when moistened, HRCM carbon nanostructures form a mass which "entangles" even the tiniest impurities and suspended particles both of an organic and of an inorganic origin.

Methods

The following methods and corresponding hand-held devices for athletes' express-analysis were used in the study:

1. Heart Rate Variability (HRV) measurements by "Cardio-meter – MT" ("Mycard-Lana" Co. St. Petersburg, Russia, www.mikard.ru).
HRV indicators, which reflect features of cardiovascular regulation (a total of 24 indicators) serve primarily to characterize the adaptive reaction of an athlete to the stressful effects of graduated exercise. Statistical, spectral, and integrated indicators characterizing the state of different levels of the cardiac cycle regulation were used [McCraty R., Atkinson M., Tomasino D. and Bradley RT. The Coherent Heart, HeartMath Research Center, Institute of HeartMath. 2006].

2. The Profile of Mood States (POMS) test [3] was used to determine the psychoemotional state and arrive at an integrated assessment of the mood and stress levels of the athletes.

3. To determine the level of the athletes' physical ability peak oxygen consumption (POC) based on the PWC170 sample was measured. These data access the optimality and efficiency of the athletes' cardiovascular systems. [Mc Nair D.D., Lorr M., Droppleman L.F. Edits manual for the profile of mood staits. SanDiego. California. – 1992].

2. Stress system "General Electric Healthcare Cardiosoft" with the cycle ergometry "Bike General Electric Healthcare" (General Electric USA).

3. Evaluation of energy potential (EP) and stress level (SL) by Gas Discharge Visualization technique with "GDV-Sport" device ("Biotechprogress" Co, St. Petersburg, Russia, www.ktispb.ru). Measurements were taken from all 10 fingers.

Experimental protocol

First, athletes were given psychological tests, and their heart rate variability parameters (HRV) and gas discharge visualization parameters (GDV method) were measured. The athletes then used a velo ergometer (bicycle exercise, a variant of the PWC test 170), and their heart rate (HR) and arterial blood pressure (ABP) were recorded. At the end of the exercise HRV and GDV data were again recorded, along with the time it took to recover baseline heart rate and blood pressure. Psychological testing was then repeated. All this was conducted before and after the 30-day period.

The variance of the data was analyzed. Indicator changes relative to the baseline in the two groups of athletes were analyzed using Student's t-test. Fisher's exact test was used to assess the significance of differences in the sampling fractions.

Results

Based on the analysis of obtained data we can make the following conclusions:

1. The criteria for measuring the impact of graphene-filtered water on the athletes were their bodies' reactions to exercise. During the standard veloergometric test in the experimental group, the analysis of the mean values of hemodynamic parameters comparing the initial and final test results yielded statistically

significant differences in the dynamics of the following seven (out of nine) parameters. Systolic ABP prior to the exercise ($p = 0.015$), diastolic ABP prior to the exercise ($p = 0.012$), HR prior to the exercise ($p = 0.001$), systolic ABP after exercise ($p = 0.001$), peak oxygen consumption ($p = 0.001$), ABP recovery time ($p = 0.018$), HR recovery time ($p = 0.003$). The values ABP, HR and their recovery times decreased, while POC values increased (Fig. 1). The direction of these changes indicates a tendency toward the optimization of the functioning of the athletes' cardiovascular system in the experimental group

These changes indicate the economization in the functioning of the cardiovascular system when that system is at rest, a reduction in the hemodynamic cost of exercise for the subjects, a reduction in recovery time following exercise, and an enhancement of the athletes' aerobic capacity. This, in turn, shows a reduction in the physiological price of exercise and an increase in the athletes' performance following a month of drinking graphene-filtered water.

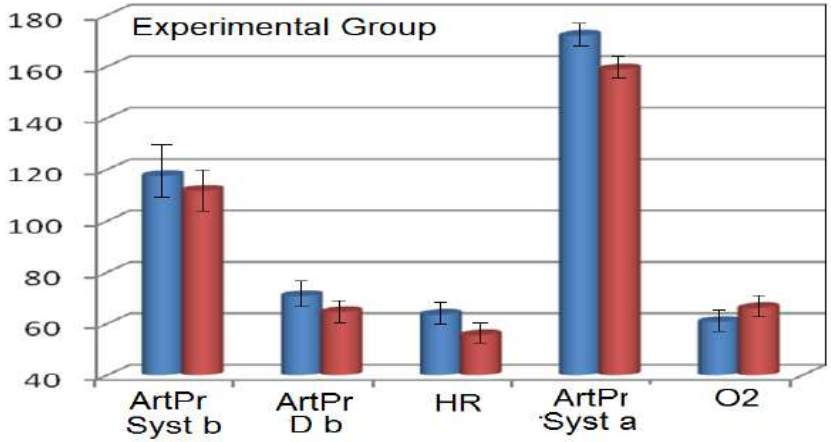

Fig.1. Dynamics of the statistically significant changes in the values of hemodynamic parameters in the experimental group.

2. Out of the corresponding parameters in the control group only post-exercise HR values had statistically significant changes ($p = 0.001$). Even this HR decrease was small.

3. In the control group of athletes a statistically significant reduction was found in the values of the pre-exercise energy potential (EP) when comparing data from the initial and the final test ($p \leq 0.001$). There was no statistically significant change after the exercise.

4. In the experimental group baseline EP values slightly increased during the active period of the training cycle and this increase was different for different systems and organs in accordance with GDV measurements.

5. The analysis of the energy performance of individual organs and organ systems showed a substantial increase in the EP values obtained during the final testing in the experimental group relative to those obtained in the control group. This applies to a number of organs and organ systems, as illustrated by Figure 2, which shows the difference in the EP values of athletes in the experimental group and those in the control group in the first and second trials.

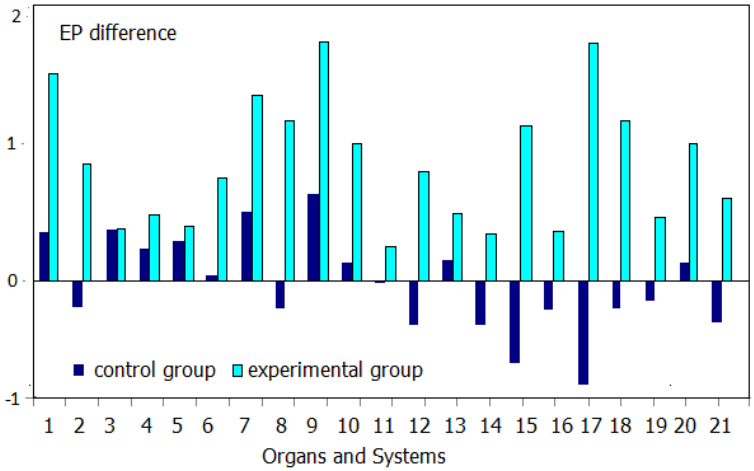

Fig. 2. The difference between the values of the indicator of the energy potential of athletes in the experimental and control groups in the first and the second trials. EP is measured in the scale from 0 to 10. 1 - Cardiovascular system, 2 - heart, 3 – blood vessels, 4 – mammary glands, 5 - hypothalamus, 6 – pineal gland, 7 – pituitary gland, 8 - pancreas, 9 - adrenal glands, 10 - genitourinary system., 11 - the spine, 12 – sigmoid colon, 13 - Rectum, 14 - cecum, 15 – ascending colon, 16 – transverse colon, 17 - the liver, 18 - pancreas, 19 – appendix, 20 - genitourinary system, 21 - kidney.

6. At the same time the difference in the values of averaged on the group parameters obtained through the GDV method when comparing samples of data from the experimental and control groups, either in the initial or in the final test was not statistically significant. Nor were such differences found before or after dosed exercise.

7. The use of rhythmocardiography made it possible to evaluate the state of the system of regulation of the HRV and the adaptive capacity of the athletes. In the experimental group comparing the data of the initial and the final testing prior to physical activity revealed statistically significant differences (by the t-test) in the dynamics of 14 indicators. I.e. the average duration of the cardiac cycle (P = 0.006), mode (p = 0.001), the minimum duration of the cardiac cycle (P = 0.007) and the maximum duration of the cardiac cycle (p = 0,002); SDNN (p = 0,048); RMSSD (p = 0,010); NN50count (p = 0,025); pNN50 (p = 0,025); MD (p = 0.007), vegetative equilibrium index (VEI) (p = 0.041); vegetative index of rhythm (VIR) (p = 0.030), indicator of the adequacy of regulatory processes (IARP) (p = 0.023), stress index (SI) (p = 0,034); VLF (p = 0.029). The F-test also found statistically significant differences for the vegetative equilibrium index (VEI) (p = 0.043) and the stress index (SI) (p = 0.005). The direction of changes in the indicator values reflects a downward trend in the sympathicotonic activity, an increase in the parasympathetic effects, and a centralization of heart rhythm management. This testifies to the improving capabilities of the body.

8. Particularly noteworthy was the decrease in the average of the vegetative index of rhythm (VIR) from 3.0 to 2.5 units. The predictive value of VIR in respect to the athletes' aerobic capacity is shown above. Similarly, in this series of experiments, the increase in the peak oxygen consumption (POC) was 8.9%. In the control group of athletes a similar dynamic of the parameters was not seen. Instead, there were shifts of indexes (VEI, VIR, and SI) in the other direction. For example, the value of VIR increased from 2.3 to 2.8 units (p = 0.01).

9. There were no significant changes in the values of HRV parameters for athletes in experimental group after a bicycle exercise. But the overall trend of their dynamic shows the growth in their bodies' adaptive capacities, primarily due to the activation of the sympathetic nervous system (the LF parameter). At the same time, control group data included indicator values changing significantly in the opposite direction. This is evidence of some reduction of the functional reserves of athletes in the control group during the bicycle exercise test.

10. While examining the psychological state of the athletes the POMS test was conducted twice - before and after exercise. No significant changes in the groups' values of psychological profile indicators were found. The exception was the increase in the mental strength factor following exercise in the experimental group (the V factor p=0.001) (Fig. 3). At the same time, the trends in the psychological states, as measured by the POMS test, in the two groups went in opposite directions. Prior to exercise, the total cumulative index S in the experimental group had an optimizing tendency. Other parameters moved slightly in the direction of optimization. In the control group comparing the data from the initial and final tests prior to exercise revealed a decrease in values of mental strength (V) and the cumulative index (S). The values of depression and fatigue indicators increased.

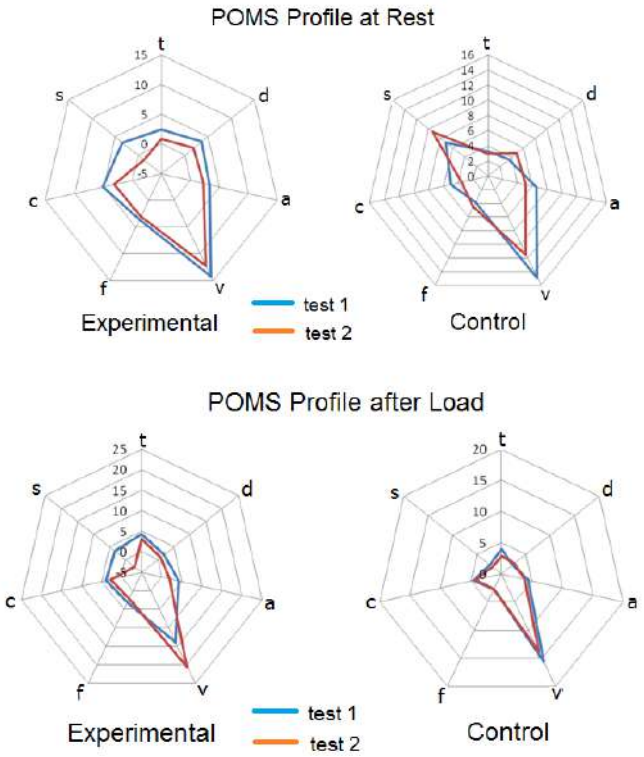

Figure 3. The dynamic of the POMS psychological profile in the experimental and control groups.

Conclusion

1. The results of the experiment have shown that after a month of drinking water passed through a graphene filter, athletes experienced statistically significant changes in their cardiovascular system. The values of HR, ABP at rest, and diastolic blood pressure after exercise decreased. POC increased by 9%, while HR recovery time following exercise decreased by 18% - and ABP by 10%. These data indicate improvement in physical performance, optimization of the circulatory system, and enhanced exercise tolerance. Such trends were not observed in the control group.

2. Based on variation pulsometry data, members of the experimental group had a tendency towards the optimization of the vegetative balance (increased parasympathetic effects on the HRV and decreased sympathetic ones). This testifies to the improving body capabilities of the body.

3. In response to exercise athletes in the experimental group saw an increase in the values of their mental strength factor, reflecting the level of competitive readiness.

4. Data obtained using the GDV method suggest that the values of energy parameters for the athletes in the experimental group remained stable, whereas the control group exhibited a decline in the values of these parameters. At the same time, in the experimental group there was a significant increase in energy potential values pertaining to specific organs and organ systems.

5. It is shown that athletes drinking water passed through a graphene filter experienced growth in aerobic capacity, physical performance, energy potential, and their bodies' adaptive reserves.

Can a bird fly across the Atlantic?

Konstantin Korotkov

How does an organism exist and develop? We commonly speak of the number of calories in different types of food products. The main idea seems to be that the more calories we consume, the more weight we gain. Simple Western dietary systems are based on the calculation and restriction of calories. However, after initial enthusiasm for this system and after thousands of pages published on the subject it was discovered that in most cases it simply did not work. An individual organism is much more complicated than an oven, where you can calculate heat produced from the fuel loaded. Some people can eat quite sparingly and stay active and healthy; some need a lot of food all the time. Many families suffer from the permanent hunger of growing children.

On the other hand, we need to ask the question: do we produce physical energy only from food? If this was the case, then how could little birds fly across the Atlantic? Let us make a simple calculation. A direct measurement of energy expenditure for free-flying songbirds migrating from Panama to Canada by using doubly labeled water was reported by a big international group [Wikelski M., et. al 2003]. In accordance with their measurements migratory flight used **15.5 kJ* h^{-1}** total energy while flying, which agrees with predicted values estimated from multiple models and wind-tunnel studies [Lindström Å., et.al. 1999; McWilliams S. R., et.al 2004]. For songbirds, one nocturnal non-stop flight for up to 600 km lasts about **7.7 h**, which takes **119.35 kJ** of energy. At the same time researchers found by direct measurements that individual birds had roughly the same body weight and fat content in the mornings before and after their migratory flights (6% body-weight loss), no change in fat content. For a 30 g bird, 6% is 1.8 g. Each gram of carbohydrate provides four kcal of energy (16.75 kJ), one gram of fat provides nine kcal (37.68 kJ). Direct transformation of 1.8 g of body mass to energy provides from **30 to 68 kJ** of energy. In reality only part of weight loss generates energy, so this number would be even less. As we see, from 119 kJ spent less than half would be covered by body mass. For birds flying through Atlantic for 3000-4000 miles non-stop, these calculations

demonstrate that they should have lost more than half of their weight during flight, which they do not. So the typical belief that "a few grams of fat can be enough to fuel a hummingbird or a warbler for a thousand miles over the Gulf and beyond" is wrong. Birds need fat to protect their body from the low temperatures and winds, which they meet at high altitudes, but this fat is not enough to fuel their flight. From the classical point of view it is impossible for the little birds to fly across the ocean, but they do and have been doing so for thousands of years! Technically and scientifically speaking, they should fall into the sea halfway across and be drowned but they do not. Do they follow another set of physical laws than those affecting inanimate objects?

We believe that there is one and the only Physics: The Physics of the Material World that is valid both for inanimate subjects and living beings. The only difference consists in the complexity and time-span of the processes. When a stone accepts sun energy, its temperature increases: the more sun, the higher the temperature. To some extent, a stone may be accepted as a **CLOSED SYSTEM**. When a healthy person stays in the sun, his temperature remains constant and we can assume that a person maintains **HOMEOSTASIS** – that is equilibrium, or balance with the surrounding environment. This is only possible due to the two-sided process of interchange. We accept energy from the sun, from food, from the air, and we dissipate energy in space. Schrödinger and later, Prigogine, Haken and others developed the concept that biological subjects are so-called **OPEN SYSTEMS.** It means that during all the lifetime they exchange not only material stuff, but both energy and information with the environment.

How this may help a bird in a migratory flight to generate an extra energy?

We do not believe that cells work as a "nuclear reactor," but we assume that birds may extract energy directly from the air. Birds breathe using a unique system in which air follows a one-way route through the respiratory system. This system is unlike our lungs, in which the air backtracks where it came from. Their system of respiration (breathing) is very efficient -

much more efficient than our system. Birds have two relatively small lungs (where gas exchange occurs), but the lungs are augmented by bellows-like air sacs (where no gas exchange occurs). These air sacs keep the lungs perpetually inflated (even when the bird is exhaling). Our lungs alternately fill and empty out. The bird's respiratory system takes up 20% of a bird's volume (our respiratory system takes up only 5% of our volume). In the bird's respiratory system, air first flows through air sacs (located even inside their hollow bones) that direct fresh, oxygenated air into the tube-like lungs (parabronchi, where gas exchange occurs) both when the bird inhales and when it exhales. We assume that together with molecular oxidation there should exist some alternative way of O_2 utilization, which provides metabolic energy.

The oxygen molecule (O_2) is unique among other molecules in the environment. It has two electrons with parallel spins (unpaired electrons) on its valence molecular orbital ($M\uparrow\uparrow$, where $\uparrow$ represents an electron with a certain spin) [Mattheus P. 1986]. Such constitution of an outer electron shell is termed a triplet state. Triplet O_2 is a vast energy store, able to release more than 180 kcal/mole upon its reduction to two water molecules after gaining four electrons (together with their carriers – protons). However, it cannot be spontaneously reduced, because according to Wigner spin conservation rules it cannot directly interact with singlet state molecules [Salem L. 1982], and that is one of the reasons of triplet oxygen stability. There are several ways to activate oxygen, and one of them – one-electron oxygen reduction. When electrons are taken by O_2 one after another, intermediate products – reactive oxygen species (ROS) arise. Some of them are free radicals: chemical species, which unlike usual molecules possess an odd number of electrons at their valence electron shell. In the desire to get a pair for a lone electron free radicals avidly interact with the neighboring electron donors, which are normally represented by molecules. A free radical gains an electron from a molecule and turns into a molecule, while a molecule turns into a free radical and starts to look for another electron donor. Thus, free radicals

may initiate chain reactions in solutions containing bioorganic molecules such as lipids, proteins, nucleic acids, carbohydrates. The best solution of this kind is blood [Voeikov V. 2001].

Radical chain reactions indeed damage important biological molecules *in vitro,* and ROS are traditionally regarded in biochemical literature as highly hazardous particles. However, a lot of old and recent data urge to assume that ROS are eminently needed for normal vital activity. According to some estimates, 10-15% of oxygen consumed by an animal at rest is routed to the univalent pathway of reduction, along which ROS are generated [Souza, H.P., et.al. 2002]. Under the stressful conditions, when activity of ROS-generating enzymes is amplified, the total oxygen consumption increases by nearly 20%, and supposedly all this excess is univalently reduced [Vlessis A.A. et al. 1995]. Therefore, ROS should play a very important role in normal physiology [Voeikov V. 2001].

Oxygen takes part in chain processes in the organism, which may be presented as follows [Voeikov V. 2001]:

$$4(O_2 + e^- + H^+) \rightarrow 4HO_2\bullet \qquad (1)$$

$$2(HO_2\uparrow + HO_2\downarrow) \rightarrow 2H_2O_2 + 2O_2 \qquad (2)$$

$$H_2O_2 + H_2O_2 \rightarrow 2H_2O + O_2 \qquad (3)$$

$$4O_2 + 4e^- + 4H^+ \rightarrow 2H_2O + 3O_2 \qquad (4)$$

Remarkably, O_2, which gives birth to free radicals, is basically the only substance, which can terminate these reactions. As a bi-radical, it can provide multiplication of radicals and increase probability of their recombination. If a radical **R↑** interacts with **O_2↓↓**, a peroxyl radical, **ROO↓,** arises. It can abstract a hydrogen atom from an appropriate molecule **R'H** making it a radical **R'↓** and turning itself into a peroxide molecule **ROOH.** The bond **O-O** in peroxides is relatively weak and under certain conditions it can break down giving rise to two new free

radicals, **RO↑** and **HO↓** in addition to a radical **R'↓.** This event is a termed a delayed chain branching. New radicals can recombine with other radicals present in the system and terminate the chain, which they lead. No less important is that the reactions of radical recombination have a unique property – quanta of energy released in such reactions may be equivalent to the energy of photons of visible or even UV-light. Gurwitsch [Gurwitsch A.G., Gurwitsch L.D. 1999] and Szent-Gyorgyi [Szent-Gyoergyi A. 1968] insisted that in the organized milieu of living systems the energy of electron excitation does not easily dissipate into heat, rather it may radiatively or in a radiation-less manner transfer to macromolecules, or to their ensembles. Energy packages equivalent to the energy of light photons released in the reactions of radical recombination may serve for biochemical reactions triggering, while their rhythmic release under certain conditions may suggest their role of pacemakers of metabolic processes [Voeikov, V. 2003].

In every chain reaction up to 8 eV of energy is realized [Voeikov, V. 2003]. For a bird consuming humid air during flight, this may create an extra source of electron-excited states for the generation of ATP in muscles. 1 eV is equal to $1.6*10^{-19}$ J, in 1 cm^3 of air we have about 10^{16} oxygen molecules, so to generate 100 kJ a bird needs to process about $10^6 cm^3$ of air. During the flight, the respiratory rate of a little bird is 60-160 breathes per minute [McWilliams S. et al. 2003]. We may evaluate that a bird processes about 10^3 cm^3 of air per minute. Therefore, to process $10^6 cm^3$ of air bird would need 10^3 minutes, or 16 hours. This number is quite compatible with a duration of migratory flights.

Biological organisms extract energy not only from food, but also directly from air, water, and the sun. External stimulii play a fundamental bio-energetic role by activation of inner vital processes. We may tell that they operate as informational signals for stimulating inner reactions. In other words, subthreshold informational stimulation and consumption, activates a cascade of pro homeo-kinetic activity.

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